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Monitor Your Environment

Tips & Advice For Finding The Best Solution To Quickly Find Environmental Problems & Issues

DO YOUR HOMEWORK, know your goals and vulnerabilities, and learn from experience. Then throw in a good amount of common sense. That simple advice can go a long way toward finding the best environmental monitoring product for your enterprise.

"Experience is the key to knowing what a particular facility will need and which features will prove to best meet a user's monitoring needs," says Michael Sigourney, president and CEO of AVTECH Software (888/220-6700; www.avtech.com).

Establish Your Priorities

Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com), says environmental monitoring needs to be a priority. "Even though the popularity of this type of monitoring has been growing rapidly for several years now, it is still very common for companies to put off the spending until after they have a problem."

Start by identifying your goals and vulnerabilities. "Is the priority to only look at the efficiency of the environment to make cost-saving improvements? Or is there a concern to make sure that all systems are operating and receive immediate notification when systems may be threatened? Threats can range from temperature, humidity,

power, water leaks, smoke, fire, security, and more. A common-sense evaluation should point to the best solution."

Sigourney says one common mistake is buying too little or too much of a solution. "We recommend users buy what they believe will best meet their needs and budget using a 'best-fit' strategy." Talk with manufacturers and their product specialists, he says. Their input can save you significant time and money.

Know Your Options

When it comes to available environmental monitoring options, Sigourney says there is a common path for most facilities.

"Typically a user starts with temperature (lots of it), a humidity sensor (for the room),

power sensors (monitoring on/off access at key sources or for each phase), flood/water (under a raised floor or between racks and water threats)," he says. Beyond that, data centers may also need sensors for smoke/fire, airflow, room entry, motion, outdoor temperature, sound, light, and other conditions, he says.

Make sure the solution you pick matches your individual level of expertise and understand that the most popular monitors have different user interfaces, Sigourney says.

Check For Alerts

Once you've figured out which sensors you need, decide how you want the system to communicate conditions and threats, Douglass says.


SNMP support is usually a requirement so you can make use of existing in-house software. Although email and text message alarms are convenient, they aren't reliable in case of a catastrophic failure, he says. "Some sort of out-of-band notification, like a phone call, provides an increased level of protection and reliability."

Sigourney says any device you consider should connect to the network via Ethernet and allow email or email-to-SMS.

Plan For The Future

Make sure the environmental monitoring solution you purchase can be expanded over time, without limits on the number of monitors, alerts, and users, Sigourney says.

Be sure to check the vendor's commitment to releasing new and enhanced versions of its monitoring software. "That's important. If the vendor regularly adds value and new features, users win," he says. "If the vendor does not keep their software up to date, you may one day find that the monitors you purchased and depend on have become expensive paper weights."

But don't forget that you're responsible for downloading firmware and software updates, he says. "Don't blame the vendor if your team is complacent and fails to do their part." 

Does It Snow In Your Data Center?

Should outside environmental conditions impact your data center planning? Absolutely, says Michael Sigourney, president and CEO of AVTECH Software (888/220-6700; www.avtech.com). The influences of extreme temperature, rain, snow, and ice challenge even the best uptime strategies.

Consider, for example, a driver losing control on icy roads and crashing into a pole supporting a power transformer. Or a large tree soaked with ice and snow falling over to break the power and cable lines off the poles that feed a building. Or temperatures approaching zero causing a water sprinkler pipe to freeze and burst. All are real-life experiences that have happened to AVTECH.

"We have great systems in place and prepare for the unexpected. However, the invisible hand of Mother Nature can reach into any data center. The best way to minimize impact, unexpected costs, and downtime is to use 'proactive monitoring' instead of relying on 'disaster recovery,'" Sigourney says.

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The screenshot displays the Processor.com website. At the top, there's a navigation bar with links like Register, Contact Us, About Us, and My Personal Library. Below this is the Processor logo and a tagline 'Products, News, & Information Data Centers Can Trust'. A prominent banner encourages users to 'Sign Up For A FREE SUBSCRIPTION'. The main content area is divided into several sections: 'This Week's Issue' featuring an article on 'Color PDUs', 'Tech & Trends' with tips on improving data center environments, and 'Data Center Products For Sale' which includes a search function for various manufacturers like 3COM, BAY NETWORKS, and KINGSTON. At the bottom, there are sections for 'Advertising', 'Subscription Headquarters', and 'Find Vendors'.

NEW! Newsstand

Committed To Equipment Sales & Repair

Pegasus Computer Marketing Specializes In Point Of Sale, Barcode, Mobile Computers & Kronos TimeClocks

DO ONE THING, and do it well. It's an age-old adage that holds true for Pegasus Computer Marketing, which has been in business since 1987.

Although the products and services the company offers have changed through the years, driven by the shift away from mainframe hardware and peripherals, its focus remains on being a total used hardware provider for sales, repair, parts, and complete systems.

Since the late 1990s, Pegasus has been selling and repairing point of sale terminals and peripherals, barcode equipment,

mobile and mounted computers, networking peripherals, and Kronos TimeClocks. It can service nearly any make or model and offers new and used parts and complete systems.

Pegasus performs all depot maintenance, flat-rate repair, sales, and buyouts from its 7,500-square-foot facility in Forney, Texas.

Having a central location allows the company to provide the best in technical and sales staff expertise and stay current on trends and the prices and availability of equipment its customers use.

All hardware sold or repaired by Pegasus is tested, refurbished, and foam-packed for shipment by staff right at its facility, ensuring total quality control and the ability to quickly turn around emergency requests from customers.

The company has stood the test of time and, in fact, still performs repairs and maintenance for some of the same retailers that have been trusting the company since day one, along with countless other companies that need a quality, reliable repair center. **P**



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FEATURED PRODUCT

Easy Labeling On The Go

Brady BMP®41 Portable Printer Offers Both Die-Cut & Continuous Labels For Use In A Variety Of Datacomm & Electrical Applications

ANYONE WHO HAS SPENT time labeling cables, patch panel strips, faceplates, or other equipment knows what a hassle it can be. You print the labels, cut them, and make sure they stay in sequence only to get to a job site and find out you've forgotten or lost a label or smeared the printed text.

It's those types of headaches that the Brady BMP®41 portable label printer helps avoid.

The printer is unique in its ability to print both continuous and die-cut labels, says Matt Luger, Brady's regional product specialist for printers.

The BMP41's ability to print die-cut labels that are pre-cut and pre-spaced inside a cartridge eliminates the time- and money-wasting issues associated with continuous printers while still offering continuous labels for certain applications.

The printer can handle any labeling need, including flags, wraps, strips, and small labels for both indoor and outdoor use. And it is easy to



use—it automatically recognizes the label installed and defaults to the correct rotation, format, size, and font, with the ability to override any default settings.

Rubber guarding, bumpers, and a grab-and-go grip ensure the BMP41 can handle field and mobile use, including drops and bounces. An optional magnet easily attaches to the BMP41, so users can affix the printer to a metal cabinet or panel.

Brady offers the BMP41 without the expensive investment typical of other die-cut printers. It costs just \$299, including the printer, long-life NiMH battery, charger/AC adapter, one label cartridge, and a USB cable.

"Never before has there been a printer at a sub-\$300 price point that allowed users to get this full, robust set of labeling capabilities and labeling muscle," Luger says. **P**

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Dynatron Puts Its Expertise To Use Designing Thermal Solutions, Including Heatsinks, Blowers & Server & Desktop CPU Coolers



WHEN YOUR PRODUCTS protect and cool millions of servers around the world—most at Fortune 500 organizations—there is, needless to say, a lot of processing power depending on you.

Dynatron meets the challenge by producing both standard and custom-designed thermal solutions, including server and desktop CPU coolers, chipset coolers, and case fans and blowers.

The company got its start in Taiwan in 1991 manufacturing DC and AC fans. It opened its first United States office

in 1995 and, since then, has opened up two more regional offices in the United States and dramatically expanded its manufacturing capacity.

Over the years, Dynatron has built reputation in the industry by developing unique and innovative products. It was the first company to produce LED cooling fan products and integrate state-of-the-art skived fin and vapor chamber technology into a heatsink.

In addition to those industry firsts, Dynatron sets itself apart from the competition by designing, developing, and

manufacturing its own products, offering consistency and high quality. Those capabilities also allow Dynatron to OEM customized solutions within a relatively short lead time.

For enterprise data centers, Dynatron has a complete line of passive and active heatsinks for low-profile 1U, 2U, and 3U servers and workstations, as well as DC fans and blowers.

Dynatron's new R24 active cooler (pictured) offers side-blowing cooling for 2U servers and larger. The R24 works with Intel LGA2011 Romley EP/EX Narrow ILM processors

up to TDP 160 watts and is made of an aluminum stacked fin with heatpipes that directly contact the CPU. **P**

Dynatron

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Keep Keyboards Out Of The Way

The Rack Solutions Keyboard Tray Can Accommodate A Mouse & Full-Sized Keyboard With Number Pad

LET'S FACE IT. Keyboards and mice are must-have items, but sometimes they just get in the way. Space-saving keyboards help, but what do you do when you need a full-sized keyboard?

The Rack Solutions Keyboard Tray is designed as an answer to this problem.

"A lot of smaller locations or even NOC rooms have PCs mounted on a wall to free up extra desk space," says Rodger Baldwin, executive account manager. The Rack Solutions Keyboard Tray allows you to fold down the keyboard and

mouse to create a full-featured workstation, he says.

It's a perfect fit for network operations centers, warehouses, manufacturing or shipping environments, or just about any place where you need a full-sized keyboard and mouse but space is at a premium. "This product was developed for a major fast-food franchise and intended to be utilized for employee training purposes," Baldwin says.

The tray is made in the United States out of heavy-duty, 16-gauge steel with

a powder-coat black finish. The smooth flow on the hinge design makes for easy opening and closing, and cut-outs allow for keyboard and mouse cords.

A small magnet on the top of the tray ensures that the bottom of the tray remains in place when not in use. It's compatible with other Rack Solutions PC and monitor wall mounts.

This is just one example of the wide variety of space-saving products that Rack Solutions has developed for its customers. **P**



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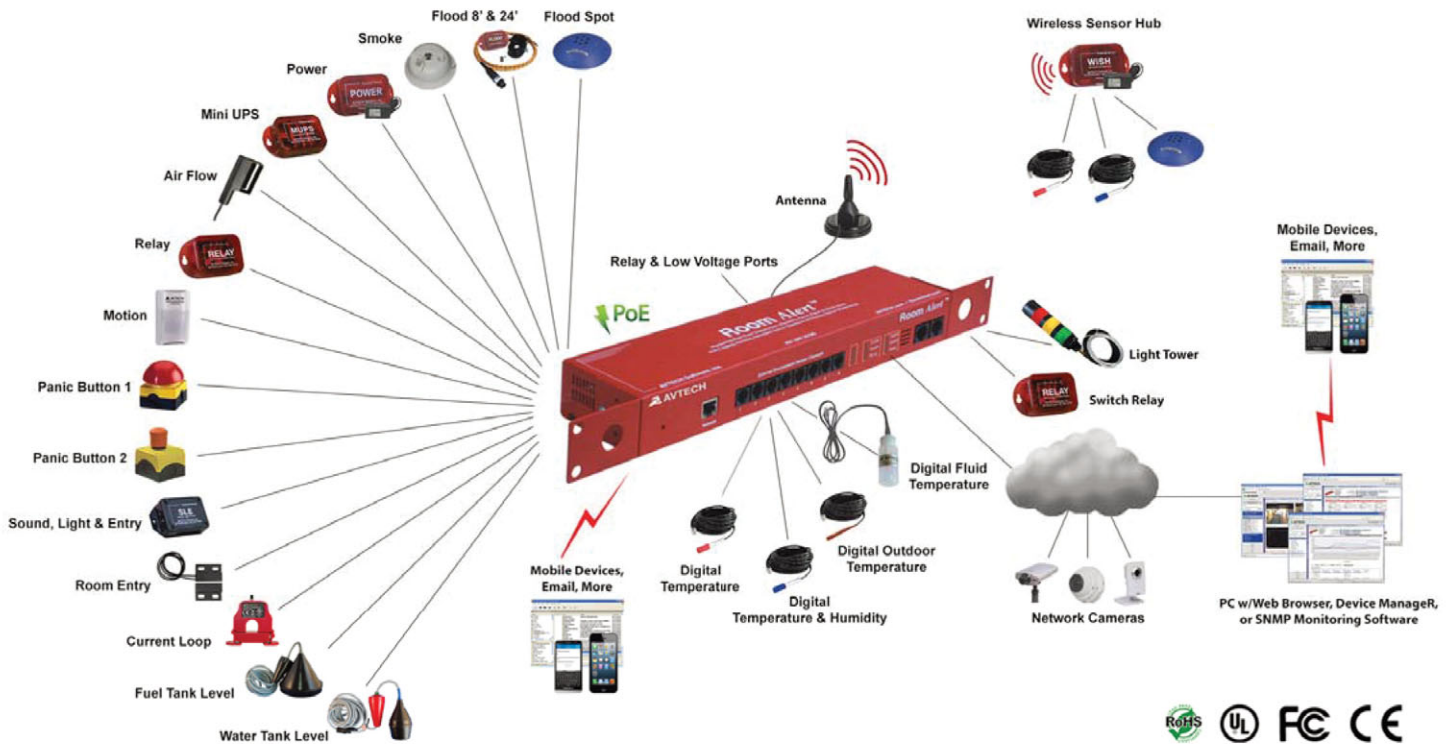
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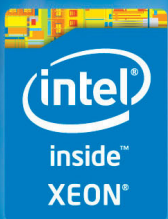
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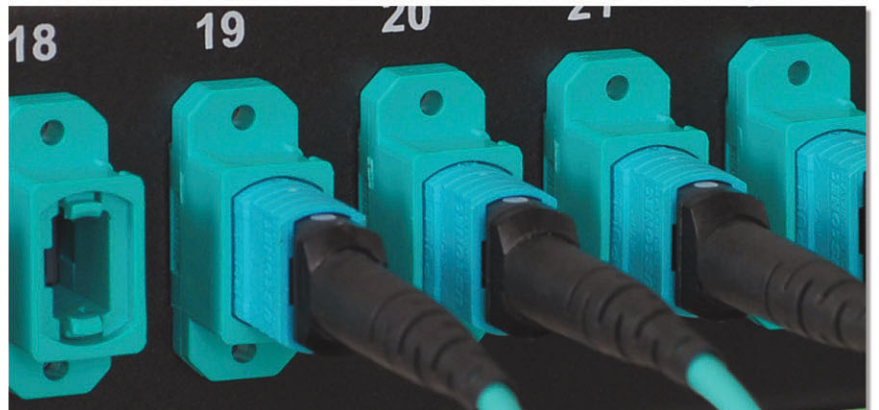
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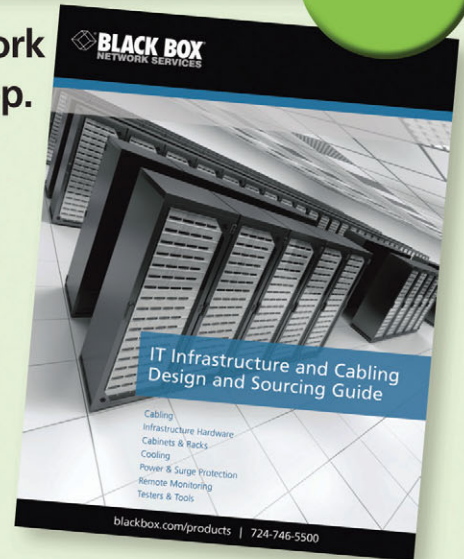
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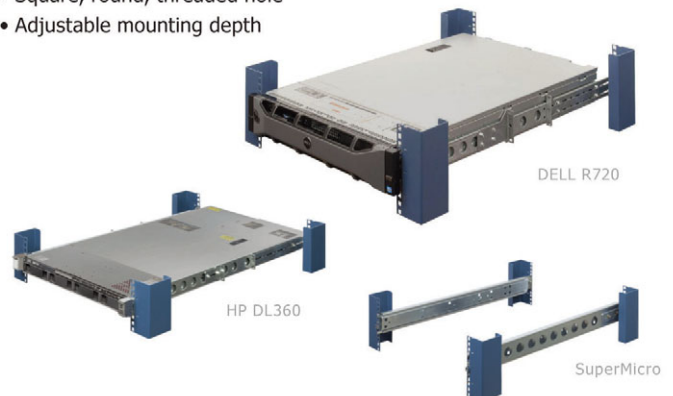
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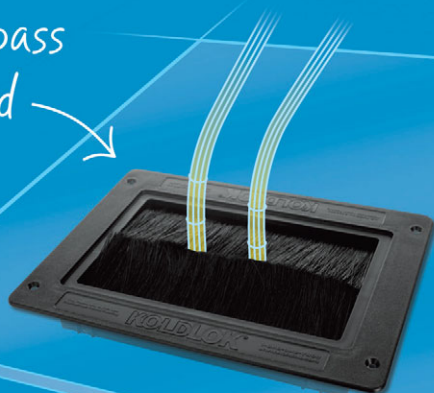


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An Easy, Affordable Way To Monitor & Manage Power

Server Technology Sentry Power Manager Provides The Data, Alerts & Analytics You Need

POWER IS STILL KING when it comes to the top concerns data center managers have as they work to keep their data centers, the equipment inside them, and their enterprises as a whole up and running.

Calvin Nicholson, senior director of software and firmware at Server Technology, says there are other concerns, including increased cabinet densities, demand for more computing power, and the need to locate stranded capacity. But many of those concerns all center around being more efficient in the way a data center uses its power.

"Power costs are going up, and availability is going down," he says. Overcoming those conflicting issues requires a way to better manage and control the power your data center uses.

Use Power More Efficiently

Server Technology's Sentry Power Manager (SPM) helps ensure you're using power in the most efficient way possible. SPM's capacity planning and predictive features help you spot stranded capacity and help you know if and when you might run out of power.

"If you're not monitoring power, how do you know how much you're using compared

to availability," he says. "If you have available capacity, you can put off a decision that could cost you thousands of dollars for colo space or up to millions of dollars for a new data center build."

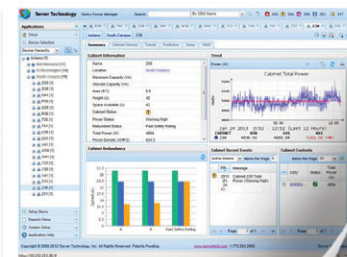
Sentry Power Manager provides a way to measure, monitor, and trend data center power information in one central location. The product comes in both a standalone appliance and virtual version.

Easy To Set Up & Configure

With SPM's SNAP feature, you put in an IP range and SPM discovers the installed CDUs—regardless of manufacturer or whether it's just a few or thousands—and brings the information back into the SPM interface.

You can configure cabinets and locations and get a global view of your data center floor and CDUs or quickly drill down to an individual cabinet or CDU. You can group and cluster outlets together across IP addresses, rows of cabinets, or the whole data center.

Use the dashboard to configure email alerts, SNMP trap forwarding, and alarms based on the power and environmental thresholds you set. Plus you'll have a central location for managing alarms.



Make Informed Decisions

Using the dashboard, you can configure your own NOC view, Nicholson says, picking views, alerts, and alarms to see on the main screen. Different users can configure different NOC views.

Such capabilities give you a way to balance power across lines and manage power systems. You can also see total power for a cabinet or a row of cabinets, he says. SPM can also show you the power usage of individual outlets in a cabinet.

With SPM's scheduling features, you can automate system reports and have them sent via email to a

recipient. You can even schedule certain devices to turn on or off as demand fluctuates, opening up the room for radical power savings, Nicholson says. "If you're trying to manage any work during off hours, looking at the power usage of all cabinet and the ability to manage power in a new device and see what cabinets have available power, he says, SPM can give you the data you need."

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Worldwide Smartphone Market Reaches Another Milestone

Vendors shipped more than a billion smartphones worldwide last year, according to IDC, setting another milestone for the devices. Smartphone growth is driven primarily by large-screen devices and low cost, says Ryan Reith, IDC program director. "Of the two, I have to say that low cost is the key difference maker. Cheap devices are not the attractive segment that normally grabs headlines, but IDC data shows this is the portion of the market that is driving volume."

Here are some other key findings from IDC's Worldwide Quarterly Mobile Phone Tracker:

1.0042 billion. The number of smartphones shipped in 2013, up 38.4% from 2012.

1.8218 billion. The number of mobile phones shipped in 2013, up 4.8% from 2012.

55.1%. The smartphone market's share of all mobile phones shipped last year; it's up from 41.7% in 2012.

Broadened Personal Computing Market Set For Growth

Traditional PCs remain "PCs" by name, but research firms are now examining the broader "personal computing" market to include PCs with tablets, mobile phones, and other portable computers. According to Gartner, this combined market will grow 7.6% this year compared to 2013. "The device market continues to evolve, with buyers deciding which combination of devices is required to meet their wants and needs," says Ranjit Atwal, research director with Gartner. Atwal adds that "the greater flexibility of tablets, hybrids, and lighter notebooks" are addressing the needs of today's users. Gartner forecasts that 2.5 billion devices included in this combined market will ship this year. This chart breaks down past and projected figures in more detail.

Worldwide Device Shipments By Segment (in thousands of units)

Device Type	2012	2013	2014	2015
PC (Desktop and Notebook)	341,273	299,342	277,939	268,491
Tablet (Ultramobile)	119,529	179,531	263,450	324,565
Mobile Phone	1,746,177	1,804,334	1,893,425	1,964,788
Other Ultramobiles (Hybrid and Clamshell)	9,344	17,195	39,636	63,835
Total	2,216,322	2,300,402	2,474,451	2,621,678



Report Provides Look At EHR Use Among Physicians

About four years after the HITECH Act authorized payments to physicians for increasing the adoption of electronic health records, a new report shows 78% of physicians offices are using some type of EHR system. The report, conducted by the National Center for Health Statistics, shows that adoption increased 21% between 2012 and 2013. About 48% of physicians offices report that their EHR system meets the criteria for a basic system, up from 11% in 2006. Most offices plan to apply for Medicare or Medicaid EHR incentive programs: 69% say they will participate in the program, 19% are uncertain, and 12% don't plan to apply.

Gartner: "App Interaction" Reaching New Levels

It's no secret that mobile applications are popular. In fact, by 2017, Gartner expects that mobile apps will be downloaded more than 268 billion times, with revenue of more than \$77 billion. These apps are changing how companies are driving content and services to consumers as users are constantly funneling data through mobile apps, says Brian Blau, research director at Gartner. "As users continue to adopt and interact with apps, it is their data—what they say, what they do, where they go—that is transforming the app interaction paradigm." Sandy Shen, research director at Gartner, says mobile apps are also opening up the idea of cognizant computing, which takes intelligent actions on behalf of users based on their historical data, preferences, and rules.

■ 3D Printing Will Spark Changes, Debate

As the 3D printing market continues to mature, we're starting to see some potential for debate and changes to existing business models. For example, some retailers are already selling 3D printers to consumers who could someday use them to "manufacture" their own custom-designed products and potentially disrupt existing retail models, says Miriam Burt, research vice president at Gartner. Businesses will find it more difficult to monetize their inventions as IP thieves are able to quickly develop and sell products, Gartner notes. The research firm reports that IP theft will result in the loss of at least \$100 billion a year in IP. Along with the growth in 3D printing comes a number of ethical debates, particularly with the use of 3D bioprinting, or producing living tissue and organs. "3D bioprinting facilities with the ability to print human organs and tissue will advance far faster than general understanding and acceptance of the ramifications of this technology," says Pete Basiliere, research director at Gartner.



■ Report: Federal Government Has Work To Do To Protect Systems

Despite a February 2012 executive order from President Barack Obama aimed at protecting the nation from debilitating cyberattacks, particularly the security of the IT systems running the nation's critical infrastructure, the federal government still struggles to implement a mandate to protect its own IT systems from attacks, according to a report by the Minority Staff of the Homeland Security

and Governmental Affairs Committee. "Weaknesses in the federal government's own cybersecurity have put at risk the electrical grid, our financial markets, our emergency response systems, and our citizens' personal information," says U.S. Senator Tom Coburn. The report, which looked at problems cited in more than 40 audits, investigations, and reviews, notes that in many cases, simple tasks such as using stronger passwords and applying patches and updates would fix some of the critical vulnerabilities.

■ Most Drivers Want In-Vehicle Calling

In a national survey designed to assess consumer thoughts about connected vehicle technology, IDC found that about half of those surveyed think it's "vital" to have phone access in their vehicle. Most respondents also want access to emergency services; however, about 75% want these services through their own device (thus maintaining what IDC refers to as their "digital identity") and about two-thirds would like the service to work with their existing provider.

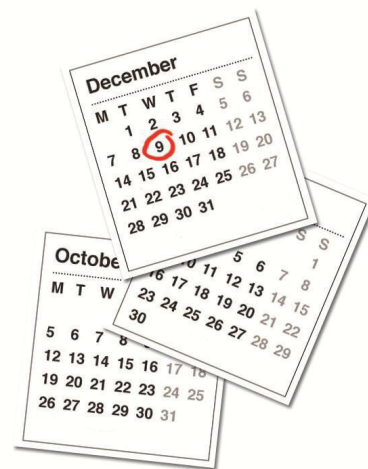
■ Gartner Analyst: 20% Of BYOD Programs Will Fail

Gartner reported some sobering mobile technology news recently, among other things asserting that consumer app developers will deem only 0.01% of their apps financially successful by the end of 2018. On the business side of things, Ken Dulaney, Gartner vice president and distinguished analyst, says that "the use of consumer technologies in the work environment presents a threat to IT control of endpoint computing resources," and that companies are addressing this threat by implementing mobile device management (MDM) solutions. "Given the control that IT has exercised over personal computers," Dulaney says, "... many IT organizations will implement strong controls for mobile devices." These controls might be too strong, and workers participating in bring your own device programs may begin to feel that their personal data isn't as private as they may like. Because of the implementation of overly restrictive

MDM measures, Gartner believes 20% of BYOD programs will fail by 2016.

■ Forget History; Think Ahead, Gartner Urges

As is the case with business analytics broadly, predictive performance metrics enables organizations to reduce dependency on historical data as a basis for future action. Rather than using what Gartner calls "lagging indicators," organizations can use predictive metrics (aka "leading indicators") to better inform decisions. According to the research firm, businesses that use such metrics will increase profitability 20% by 2017. In a fourth quarter 2013 survey, Gartner found that 71% of business and IT leaders knew what key performance indicators were most important for their business, but only 48% had access to relevant metrics.



■ Out With The Old Windows, In With The New

The latest Windows operating system statistics from analytics firm Net Applications show that Windows XP usage, which had begun to decline in 2013 and then stabilized temporarily, has again begun to decline; as of December, the OS was used on 29% of desktop and notebook computers worldwide. Windows 8, on the other hand, which got off to a sluggish start and caused worries for Microsoft through much of last year, rallied at year's end; Windows 8 and 8.1 combined were installed on 34% of computers in December, up from 28% in November.

Improve Network Monitoring Capabilities

Use Current Tools & New Strategies For Better Performance & Bandwidth Insights

MONITORING ENTERPRISE networks is generally considered one of IT's more difficult tasks. Even with proper tools onboard, the job is often challenging, especially for smaller enterprises that may lack personnel with extensive networking experience and expertise.

The good news is that there are ways to get more from the tools and information you already have available and employ newer strategies to improve monitoring from performance and bandwidth perspectives.

Use What You Have

Many small to midsize enterprises (SMEs) don't take full advantage of all that their network monitoring tools offer. Usually, says Mike Fratto, principal analyst at Current Analysis, networking monitoring in SMEs is limited to the port status and utilization

information SNMP managers provide. Companies usually get added value from deploying more in-depth monitoring, though many haven't, he says.

Often, says Roy Illsley, principal analyst at Ovum, tools are complex to configure and use, making it difficult for SMEs to dedicate the time to develop monitoring. Ovum is seeing a rise in "just-enough management" capabilities where tools don't do everything but rather focus on key management and monitoring aspects, making them easier to deploy and use.

Gartner Research Vice President Jonah Kowall says most SMEs use some basic or advanced level of network availability monitoring, but few use any performance monitoring.

Jim Rapoza, Aberdeen Group senior research analyst, says his research indicates some "new economy" small



businesses (startups, for example) are fairly cutting-edge in understanding their connectivity and cloud presence. Classic SMEs, however, often don't do much in terms of network monitoring and analytics, he says.

Many organizations struggle with how much the nature of company networks is changing, especially companies "stuck using legacy tools that come up short with modern technologies such as virtualization, the cloud, and SDN," he says.

Take The Time To Learn

Better using the tools you already possess generally requires committing the time to learn how they work and how to get relevant information from them, Fratto says. This is partly a training and experience issue, but it's also about learning to ask the right questions and which tool can provide the answers, he says.

"Using simple SNMP data gathering is a good example," Fratto says. "You can find out

what the link utilization is on a particular link, but if you ask 'which applications are taking up the most bandwidth?,' SNMP monitoring won't tell you that."

Kowall says many SMEs use flow data to identify the basic nature of what applications are utilizing the network and which users or devices are consuming bandwidth (or at least which ports they're using). More advanced deep-packet analysis is where "most of the gems lay, including

Key Points

- Often, companies don't fully use the tools they already have due to time and complexity.
- Getting more out of tools generally requires making a time commitment to enable the proper training.
- Many enterprises can and should be more effectively using network monitoring logs.

Get Started

Info-Tech Research Group Principal Consulting Analyst Mark Tauschek says every enterprise should have a network management system in place that actively monitors the network and all its elements at all times. Assuming one is in place, the biggest improvement most organizations can make is monitoring traffic flows to understand which users, applications, and services are impacting network performance, he says. The next most important tool is a NetFlow/sFlow monitoring system (either standalone or an add-on to core network management system), while packet-level tools can prove helpful for granular troubleshooting, he says.

much deeper application visibility and actual performance data,” he says.

Rapoza says many businesses don’t understand when problems occur on their networks because they don’t really know what’s normal, thus the benefit of determining a network baseline.


Illsley says it’s critical to understand what does and doesn’t need monitored and managed and what value this can bring to IT cost-savings and business benefits. He advises carefully considering where current problems are (slow access to your Web site for customers, for example) and where you can add value to drive business growth.

Log It

Many enterprises can typically benefit from better using network monitoring logs and applying newer strategies. Rapoza says Aberdeen Group is starting to see big data approaches to network analytics in which tools and processes take all information from entities on the network creating logs, activity, and performance data and use it to create unified intelligence to get a big picture of network performance and activity.

Illsley says although greater use of analytics in operational management is generally still too expensive for SMEs, he advises watching the space as

small startups are beginning to offer this as a service.

An interesting use case for log analysis Fratto has seen involved a company that configured alarms for log entries that fell beneath a certain threshold for set period of time. “They had an appliance that sent logs at a fairly constant rate, even when there was no activity on it, but if it crashed, the logs would stop altogether,” he says. When the rate of log entries fell to zero for three minutes, an alarm was issued that the appliance had crashed. “It’s an interesting case because the content of the logs didn’t matter, only the behavior,” he says. 

Action Plan

Plug the gap. Performing a gap analysis that focuses on where IT currently is, where it wants to be, and what’s missing can help determine how to prioritize and achieve network monitoring goals.

Detect. Pinpointing what workloads are consuming which network resources can help organizations extend their monitoring and management appropriately.

Get real-time data. Implement processes that let you address problems immediately upon detection and build an overall solid base. Aim to cover all network information types, including real-time data, log, root-cause analysis, performance-management systems, and virtual- and cloud-management data.

Top Tips

Know. Sujan Sami, program manager at Frost & Sullivan, says the more technicians know, the better they’re equipped to effectively use tools. “Analytical tools are really the tools to monitor data sources,” he says. “The more data provided, the better for these analytical tools to provide apt results.” Network administrators must prioritize their needs and understand what type of testing is required at the right time, he says.

Train. Sami says that to use equipment most effectively, you need a clear understanding of test equipment features and functionalities. “Training is the best way to educate and gain knowledge. After-sales service and customer relationship is key, he says, thus a two-way conversation should occur between the test vendor and IT to effectively use the tools.

Analyze. Ideally, Sami says, IT is required to monitor the entire network. Today, several tools are available that can test based on the network infrastructure. “Understanding their network infrastructure is critical for their performance,” he says. Before purchasing test equipment, internally analyze what type of testing is needed and which vendor provides the best solution. Also choose the right test equipment that can support the enterprise in the long term and don’t be blinded by a current need, Sami says.

Choose The Best SSDs For Your Enterprise

Spinning Disks Aren't Dead Yet, So Make Sure Your Choice Of Product Will Integrate Well

SO YOUR ENTERPRISE is ready to make some new storage investments, and you're in charge of the research. You know solid-state drives are supposedly the trend of the future and you're ready to jump on the proverbial SSD bandwagon.

But where do you begin? How does purchasing SSDs differ from traditional hard drive-based storage? And how can you guarantee the SSDs you pick are the best fit for your enterprise? Having a solid understanding of the technology and the overall market direction can help.

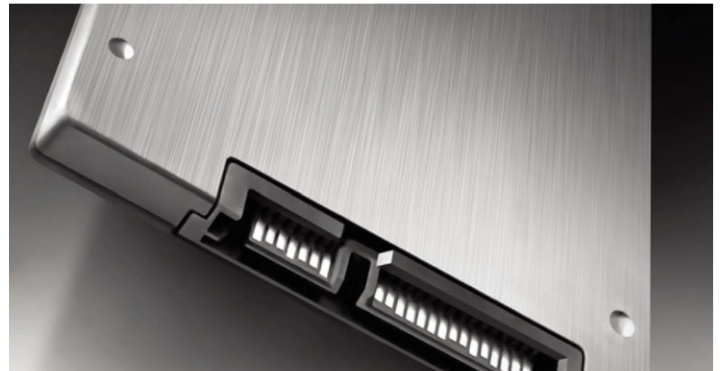
Where SSDs Fit In

The best place to start is by knowing what SSDs are capable of. Mike Karp, vice president and principal analyst at Ptak Associates, says SSDs currently represent just a small part of the overall enterprise storage hardware market. But

for certain use cases, demand is strong and accelerating.

For example, he says, SSDs are doing well as boot drives within systems; for applications that require high levels of I/O (often handling the application's "hot" data, or metadata, rather than being used for general storage); and in corporate laptops, where the added expense associated with an SSD is more than offset by the benefits of lower power consumption and greater reliability than is available with spinning disks.

Rob Enderle, principal analyst at Enderle Group, says SSDs are finding the greatest use for "pretty much anything where speed can justify extra cost," such as trading, real-time analytics, defense, and some healthcare applications. "As the cost has dropped, the technology has branched out to other less-critical areas, but



it is well past the early adopter phase and into mainstream."

The Benefits

There's more to SSD technology than just speed and faster I/O, Karp says. "Faster I/O is the primary driver for pro-SSD decisions within the data center, but the fact that SSDs consume less power than HDDs is another key benefit that data center managers should not ignore."

Karp says that, because SSDs are still more expensive than mechanical storage, power consumption may not be a motivating selling point with data center managers in enterprises where the power bill goes to the facilities department rather than the IT department.

But as more SSDs make it into the data center, he says, SSD pricing continues to decline. Karp says that, probably within a few years, SSDs will be no more expensive than mechanical drives with 10K and 15K spindles. "This will be the death knell for high-end hard drives, because

Key Points

- If the speed benefits of solid-state drives outweigh the cost, you have a good use case.
- Don't simply pick any SSD solution; pick the one that best matches the task you'll be using it for.
- The software you use to manage your storage system is more important than ever and needs to be able to make intelligent decisions.

they can never use power as efficiently as the SSDs," he says. "I just can't think of a case where adding spindles—no matter what their speed—is a cost-effective way to speed things up."

This growth of SSDs may not impact the sales of low-end disk drives, Karp says, which will continue to be the medium of choice for scale-out situations.

David Drysdale, Ph.D., consulting analyst at Info-Tech Research Group, agrees.

Get Started

When comparing SSD options, Rob Enderle, principal analyst at Enderle Group, says you're looking for return on investment and reliability trade-offs. "SSDs aren't all equal, and you don't want to just pick SSD solutions; you want to pick the solution that best matches the task set you want using it."

Enderle says hard drive storage has become far more generic as the providers dropped down to the current level, but a large number of vendors sell SSDs, with a broad array of configurations and price ranges. "So you either need to know what you are doing or use a vendor who you know will have your back."

“We’re seeing fewer vendors offering 15K disks as an option now as their use cases are being moved to SSD, usually paired with slower spinning disk as a target for cold data,” he says.

“I don’t think spinning disk is dead yet—not by a long shot. People were saying that about tape not that long ago, and many organizations are still using tape quite effectively. But flash adoption will increase for performance-intensive applications, while disk will be used for longer-term storage of less active data.”

Although performance is a primary benefit of SSDs, Drysdale says, other benefits include a smaller footprint, more efficient use of power, and fewer moving parts that can fail.

What To Look For

Follow a few basic steps when purchasing SSDs, Drysdale says. Start with a list of requirements and provide as much detail as possible in your initial request for information. “Remain agnostic to advanced features,” he says. “Vendors approach things in different ways, and if you are too specific about the architecture, you might miss out on a more effective solution that just happens to do things in a different way.”

Compatibility and integration with an existing infrastructure is also key, Drysdale says. “Make sure the solution supports the required protocols, provide I/O

information for relevant database apps, and make sure that the solution is compatible with your applications. Describe your virtual environment and request information about how the solution integrates with your platform.”

Because there are many varieties of solid-state storage, Karp says, the most important thing to remember is that, because solid state is still more expensive than mechanical storage, the software that manages storage systems is more important than ever.

“Software should be able to make intelligent decisions about what data to put on the SSD and what data to deploy out to less expensive spinning disk, and it should be able to ensure that, over the course of time, the most significant data in the most deserving applications get the highest levels of service.” **P**

Action Plan

Know where you can benefit from solid-state drives.

“Applications where faster I/O is needed are the poster children for when to use an SSD,” says Mike Karp, vice president and principal analyst at Ptak Associates. Customer-facing applications, order-entry applications, and search engines are just a few examples of places where SSDs are easy to cost justify, he says.

Compare options. It’s not easy to become an expert in solid-state storage, so find a vendor you’re comfortable with, says David Drysdale, Ph.D., consulting analyst at Info-Tech Research Group. “Vendors may push product to market a little faster than is desirable. Buyers should be sure they have a good list of references to talk to. And there’s also the risk that the vendor will be acquired by a bigger fish or fail altogether. Finally, because some applications are optimized for spinning disk, see if the vendor will let you try before you buy to make sure that you’ll achieve the performance you expect.”

Top Tips

Know the limitations. Despite all the hype, David Drysdale, Ph.D., consulting analyst at Info-Tech Research Group, says flash storage has limitations. For example, performance of flash degrades over time as cells lose their charge the more they are written and as the storage gets closer to capacity. Buyers need to ask the vendor about the software being used to overcome these limitations, he says. “They’ll need to ask about error correction, wear leveling, garbage collection, and wear out prediction management.”

Cache, tier, or integrated? SSDs are being incorporated as a cache, a tier, or with spinning disk, Drysdale says. Auto-tiering, he says, lets you look at block sizes and the frequency of the tiering process. He says to consider that flash caches are updated in real-time while auto-tiering moves the data just once per day; tiering requires extra capacity; caching can take some time to warm up; and cache-based systems are frequently more expensive as they use SLC flash, while a tiering strategy can take advantage of lower-cost MLC flash. “Every vendor will tell you that their way is better, but take a close look at your use case and see what makes sense.”

What To Know Before Signing The Dotted Line

The Cloud Licensing & Contract Considerations Enterprises Should Consider

COMMITTING TO CLOUD computing isn't easy. Beyond the security and data concerns enterprises must weigh, finding the right provider can be a daunting process. Unfortunately, the process doesn't stop there, as there's the matter of settling on contract and licensing terms with the chosen provider in a manner that builds in protection for the enterprise in terms of uptime, accountability, costs, and other areas.

The following tips and suggestions can help avoid common licensing/contract mistakes, show where to focus attention, and ensure the requirements are met.

Know The Landscape

Lynda Stadtmueller, Frost & Sullivan cloud services program director, says generally cloud services don't come with negotiable contracts, which is a big appeal of the cloud in the sense that services are available on demand for as long as

the enterprise wants with no term or volume commitments. Essentially, customers pay for only what they use.

In the highly automated, self-service world in which online transactions generate cloud service subscriptions, a user simply "clicks" to accept a provider's service terms, Stadtmueller says. "Other than for managed cloud services, enterprises may not have much opportunity to negotiate specific contract terms," she says.

Stadtmueller also says, however, that most providers will work with enterprises to configure cloud environments to meet the enterprise's reliability, availability, and security needs, possibly on a specific workload basis.

Info-Tech Research Group recommends knowing where a cloud service lives. "The cloud is an amorphous abstraction, but behind it all there's real hardware, silicon, switches, and spinning disks," says John



Sloan, principal consulting analyst at Info-Tech Research Group. It's good to seek assurance on the level of compliance these facilities offer concerning various security and regulatory frameworks, he says, but you should determine who actually owns and controls the facility.

A cloud provider that's a tenant in someone else's facility can impact service guarantees, Sloan says. Often, cloud contracts contain language that indicates a provider guarantees a certain level of service for what is in its control, which can be a "big escape hatch," he says. Info-Tech generally recommends using providers that own or control their hosting facilities, though it may be worth using a "reenter" if there's a significant cost benefit, say 25% less than a facility owner, Sloan says.

Read The Terms

The biggest mistake an enterprise can make is not reading

the terms it's agreeing to. This is something that's common among consumers but is now carrying over into the business world, Stadtmueller says, particularly because it's so easy for employees (not just authorized ones) to subscribe to cloud services. Failing to read terms can mean not understanding the degree of responsibility a provider is taking, she says.

For example, some infrastructure-as-a-service (IaaS) providers offer 100% availability service-level agreements (SLAs), which many users misunderstand to mean that services will never fail. "In fact, the SLA simply reflects the amount of credit and the conditions under which the provider will pay when the service is disrupted," Stadtmueller says. "This can come as a shock to customers that assume the cloud service means they don't need to engineer redundancy."

Stadtmueller says the components and time frame covered

Establish Policies

Lynda Stadtmueller, cloud services program director at Frost & Sullivan, recommends establishing policies that govern cloud subscriptions and implementing them company-wide. "You may implement a 'cloud-first' strategy for new applications or establish a marketplace of approved SaaS apps for employees to select from," she says. "IT and procurement should establish procedures for managing multiple cloud vendors to ensure consistent performance parameters and appropriate service terms."

by an availability SLA can vary widely among providers. Thus, an enterprise may experience a service disruption lasting days but find the SLA doesn't apply. She says no major cloud service provider accepts liability for lost, stolen, or damaged company data. "Customers who don't understand that are potentially risking their business," she says.

Overall, Sloan says too much stock is put into SLAs, which primarily are about providing some level of assurance of redress in event of an outage, such as billing credits. "That's nice, but it means nothing when the outage occurs," he says. "Vendors largely base their SLA penalties on what they can afford when service interruptions occur, not what you can afford. Customers often think that the SLA is a kind of club or coercive tool to get better service. It's not."

Sloan also says you should obtain clear language about what the provider will do after an outage or service degradation. For example, what's the diagnostic/recovery procedure, how is progress communicated, and what is the problem-escalation procedure if you're not getting adequate service?

Another way SLAs are generally inadequate is that most focus on simple uptime metrics, Sloan says. Arrange for annual service reviews with the provider that

have an impact on service renewal and pricing, he adds.

Have An Exit Strategy

Avoid entering a bad contract by mainly knowing the risks and being realistic about what's being contracted, Sloan says. Generally, you get what you pay for, he says.

"Cloud services aren't white-glove managed services. They are enterprise managed services that call themselves 'cloud' because it's cool, but they really aren't. Clouds are best effort, and for many workloads that's good enough. If you want more, you need to pay more, and then you find yourselves in a much more expensive proposition than what the cheap and cheerful 'cloud' appeared to be," he says.


Sloan stresses the need for an exit strategy, which he equates to a marriage prenuptial

agreement. If you cancel services with the cloud provider, know the procedures and time frames for getting data back, for example. One way customers can feel burned by providers, he says, is if the provider goes out of business and leaves customers "swinging in the proverbial wind."

Get Your Needs Met

To ensure a contract best matches the enterprise's cost, reliability, accountability, and other needs, Stadtmueller says

to first figure out your requirements. Not all workloads need the same amount of security or redundancy, she says, therefore approach cloud decisions on a workload-by-workload basis.

"Ideally, your chosen vendor can support multiple environments (on-premises and hosted, dedicated and shared, virtualized and bare-metal, public and private), so you can ensure each workload is in the optimal environment while controlling them via a single management system," she says. 

Do Your Homework

The barrier to cloud entry is so low, says Lynda Stadtmueller, cloud services program director at Frost & Sullivan, that many enterprises make impulse purchases without doing their homework. Conversely, "you can't enforce the same onerous procedures that govern capital investments, or your users will just go rogue, increasing the risk to the company," she says.

BONUS TIPS:

Don't Get Burned

Frost & Sullivan Cloud Services Program Director Lynda Stadtmueller says enterprises won't get burned by a bad contract if they approach their cloud computing decisions with the same due diligence they do other IT purchases. "The good thing is that the providers' terms and conditions

are transparent. They're always posted right there on the Web," she says. To determine what might be possibly missing in a provider's terms, she advises reading, understanding, and comparing service terms (not just prices) across all vendors you're considering.

Questions To Ask

Before signing a contract with a provider, Dan Kusnetzky,

founder of Kusnetzky Group, recommends asking if the cloud provider can offer the levels of support you need when you need them, easily scale up and down to match the business, and ensure data will remain private and secure. Also determine who can see your data (and for what purposes) and how easily you can upload and download data and applications.

Troubleshoot Problems With Power Equipment

Plan Ahead, Prioritize Your Approach & Get Outside Help When Necessary

IF THERE IS ONE THING you can count on in a data center, it's that your equipment is bound to break down over time both through normal wear and tear and unforeseen complications.

Because power equipment is essential to keeping your data center running, you need to prepare for the wear and tear and have a plan in place for what to do if a failure occurs.

Perform Regular Maintenance

Not every power equipment problem is a massive hardware failure that requires a full replacement. PDUs, UPSes, and other power devices are often comprised of many smaller parts that can all come with their own complications.

"Most problems occur due to poor maintenance or lack of maintenance programs," says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com).

One of the most basic elements is keeping room temperatures within the factory recommended window.

Beyond that, Koty says, circuit breakers throughout the entire critical infrastructure, starting at the main building input switchgear right down to the individual branch circuit breakers in the PDUs, need to be exercised at a minimum of every two years.

Equipment needs to be shut down and cleaned and filters need to be replaced on a regular basis. Backup diesel generators need to be exercised on a regular basis under load. "Generator batteries should be replaced every three years, and be sure oil is kept clean. Stored diesel fuel can also be a single point of failure. Fuel should be tested at least twice a year to be sure it does not become contaminated," Koty says.

Batteries can cause issues if not managed correctly. Matt



Burkle, national channel manager and sales engineer at HM Cragg (800/672-7244; www.hmcragg.com), says the batteries within a UPS have both a storage shelf life and a usage life. For example, he says that a "typical VRLA battery has a life span of three to five years, whereas a flooded wet cell battery can last upward of 25 years. Batteries can be counted on to age and fail within a set time frame, and this needs to be addressed."

Koty says you should perform a visual inspection of batteries, staying on the lookout for low water levels (wet cells), corrosion, post seal leaks, or any distortion in battery cases.

Start Simple

When troubleshooting any potential power supply problem, start with the simplest potential issues and then work your way to more complex issues. For example, individual battery failures are some of the most common problems that occur with power equipment. If you follow

Key Points

- There is constant wear and tear on PDUs and other similar devices, so it's important to plan ahead for troubleshooting.
- Troubleshooting should start with the smallest potential problems first and then move to more complex problems.
- Don't be afraid to enlist a third-party specialist and avoid self repairs that could make your problem even worse.

the "start small" philosophy, this could be the difference between replacing a relatively inexpensive battery and replacing your entire power supply because you just assumed it was a widespread failure.

When troubleshooting, Koty says, you first need a general understanding of the equipment and how it works. "Typically one would start at the last component in the critical path and work your way backward

Get Started

According to Matt Burkle, national channel manager and sales engineer at HM Cragg (800/672-7244; www.hmcragg.com), the best place to start with troubleshooting power equipment is to create a standardized response plan based on specific events. Such a plan "can decrease the potential of a catastrophic failure and decrease the mean time to recovery (MTTR) if downtime transpires. Having and knowing these response plans coupled with a strategic preventative maintenance program is a very effective way to minimize and recover from issues that happen with power equipment in the data center."

until you reach a point where you have no power,” he says. Check power readings, voltage, and amperage, and look for loose connections or discolored parts that indicate a heat issue.

It’s also important to keep track of your existing equipment and even the atmosphere of your entire data center, Burkle says. “If the batteries are showing premature failures, then maybe addressing environmental concerns could alleviate that issue,” he says. “Another big trend is to deploy specific battery monitoring systems to constantly measure and report if any single battery is performing outside of the manufacturer’s specification. A single weak battery can cause an entire battery string to fail.”

Also consider an infrared scan of electrical panels to look for hot spots, Koty says. “Loose or weak connections between breakers and the main panel bus, overloaded circuits, load imbalances, harmonic problems, and defective electrical components can all contribute to a thermal scan heat signature, leading to potential equipment failure.”

Consider Hiring A Third Party

Although you can save money by performing your maintenance, troubleshooting, and repairs in-house, the ability to do so depends on the knowledge of the data center staff in regards to the equipment, Koty says.

Burkle says, “Nearly two-thirds of downtime events

with power systems stem from preventable causes, such as human error, lack of process, insufficient maintenance, and incorrect procedures. The recurring theme with those issues is that they are all controllable. It’s important to maintain your equipment and make sure it’s working as efficiently as possible, but if you try to repair equipment yourself, you could end up exacerbating the issue.”

Power equipment experts are trained to troubleshoot power equipment of all kinds. Many third-party repair companies are also available for emergency service. Make sure you partner with a trusted vendor. When you regularly work with the same third party and they get to know your data center, repairs will take less time. **P**

Action Plan

Follow a process. Start small by focusing on individual components such as batteries and circuit breakers. Move on to larger aspects of the system and use monitoring data to pinpoint problem areas.

Check repeat offenders. If a piece of power equipment fails on a regular basis, make sure it has enough capacity to support your servers and other devices and also check your overall environment to see if cooling needs are being met.

Work with an expert. Work with a third-party repair expert to not only fix problems as they occur but give you peace of mind by being available to you whenever you have power equipment issues.

Make a schedule. Set up a preventive maintenance schedule both internally and with an outside provider to prevent as many potential failures as possible and keep your data center up and running.

Top Tips

Know the components that commonly fail. UPSes commonly encounter problems with components such as logic boards, fans, power supplies, and capacitors. These components will eventually wear out with normal use, so it’s not a question of if the power equipment will have an issue, it’s when. The best way to prevent failures and costly downtime is to be proactive.

Perform preventive maintenance. Regular preventive maintenance is crucial to achieve maximum performance from power systems. Studies have shown that customers without preventive maintenance visits were almost four times more likely to experience a UPS failure than those who performed the recommended two preventive maintenance visits per year.

Monitor UPSes. A UPS monitoring system and process is also very important. Monitoring the UPS over the network can give you real-time data as to the power environment as well as the overall health of the system.

Protect Your Network From The Newest Malware

Targeted Malware, Longline Phishing & Other Attacks Can Leave Your Enterprise Vulnerable

SECURITY SOLUTIONS are more advanced than ever, but so are the malware programs that are trying to burst through your defenses.

It used to be that you could run a simple virus scan and remove most, if not all, of the malicious programs from your computer. But now, hackers are growing more sophisticated. That's why it's not only important to have strong security controls in place, but to also understand how these malware programs attempt to trick users into infecting individual machines.

Targeted Malware

Attacks have become more sophisticated. For instance, email phishing schemes started off with emails designed to entice users to click links, but people eventually figured out how to spot these

messages. Now, these messages are much more in-depth, sometimes copying company logos and email signatures to appear legitimate. Plus, attackers are now able to utilize targeted malware that is aimed at specific people within an organization.

"[Hackers] use attack vectors, like traditional phishing attacks, to craft customized phishing emails that are very hard for even a trained employee to recognize as illegitimate," says John Kindervag, principal analyst at Forrester Research.

"Within that, they'll try to have some attachment or document that's been weaponized using a [program] flaw so they can eventually get deeper and deeper into the network because they've gotten into a machine on the local area network. And, unfortunately, a



lot of people don't monitor the behavior of those machines."

Other Threats To Consider

There are other new types of attacks to consider, too. In terms of phishing, for example, Jessica Ireland, consulting analyst at Info-Tech Research Group, says that hackers are going much more in-depth with their email phishing scams and are employing a tactic known as "longlining."

In the angling world, longline fishing involves attaching a number of lines and hooks to one longer line. This makes it possible to catch more fish at one time.

In the technology world, longlining is similar, except you replace the bait on those hooks with emails and those fish with your employees. The idea is to catch as many victims as possible, have them click a link in the email, and infect their machines. If a hacker is able to gain access through multiple portals, then it's more likely the hacker can

grab sensitive information before anyone notices.

Kindervag says viruses also are growing more complex. "Probably the newest thing is the unlimited variance that an attacker can create through these modern malware kits, so you can always create a piece of malware that your antivirus system hasn't seen," Kindervag says.

"We're even seeing some trends where malware authors are making malware that understands the environment that it's in. For example, because there's been a big movement toward sandboxing technology to identify zero-day malware, we're seeing some evidence that the malware looks to discover whether it's in a sandboxed environment and then will act differently inside the sandbox than in a normal environment."

Is Your Existing Security Approach Enough?

If your company is in a particularly low-risk industry and

Build A Better House

Companies need to take a different perspective when it comes to both their network architecture and malware and other threats. John Kindervag, principal analyst at Forrester Research, says organizations need to understand that "there's always going to be a problem." He compares networks to houses located in tornado-prone regions. "If you live in a tornado state, you don't try to stop the tornadoes, you try to make the houses stronger and safer and you try to do something to make it more survivable," Kindervag says. "The important thing to remember is that it's an adversarial business. You're not trying to focus on a particular attack; you're trying to distinguish good traffic and packets from bad traffic and packets."

doesn't deal with sensitive information, then your existing security infrastructure may be enough, as long as you take the right steps to maintain it.

"Organizations can obviously improve their existing systems by staying on top of updates, but attention must also be paid to process in conjunction with technology," Ireland says. The only way to make sure your security solutions will perform effectively is to make sure your employees know how to use them and to supplement your security controls with rock-solid policies.

New Solutions & Strategies

Even if you have a strong security approach in place, there's likely room for improvement. Vendors are constantly working on new security technology designed to protect your network and data from all angles. For instance, next-generation firewalls add more features, such as Web content filtering and data leakage protection, to the traditional firewall, Ireland says.

You can also look into newer security solutions such as security incident and event management (SIEM) systems, Ireland says, which assess risks and alerts to let you know of potential attacks and network access control (NAC) systems that help you control access to your network much more effectively.

Kindervag says having visibility into your entire network is going to be really important but adds that encryption will be equally important because "at the end of the day, you probably can't stop all attacks. Some of the newer technologies around encryption are going to be very helpful, because while we may not ever be able to stop data theft, we could make sure that when an attacker gets our data, it's encrypted and can't be monetized or come back to get us in trouble from a regulatory perspective," he says.

Kindervag stresses that technology isn't enough when it comes to security and that employee education can only go so far. "We trained users to click on links and then we yell at them when they click on the one malicious link out of 5,000 previous links that were good," Kindervag says.

His solution is to stop thinking about networking and security as two separate domains and instead simply create secure networks. If you can build security controls into your network and

then encrypt your data on the back end just in case an attacker gets through, you'll be much less likely to suffer major losses and will have a solid foundation to build on in the future. **P**

Rethink Network Architecture

"There will always be newer technologies to deal with malware," says John Kindervag, principal analyst at Forrester Research. But the most important issue, Kindervag says, is that many companies are suffering from network architectural problems. He says that we've been building our networks based on older, traditional foundations that simply don't stand up to current malware capabilities. "We have networks that were designed in the last century that are not very resilient to attacks, because the concepts of networking that we use today were created before there were attacks," says Kindervag.

"We have to redesign our networks. We have to switch from focusing on protecting the network, devices, or even users and focus on protecting the data. Data is the thing that has value and gets us in trouble if we lose it, and data is the thing that we need to focus on. Being more data-centric is going to be very important as we move forward if we want to achieve any level of security."

BONUS TIPS:

Create Consequences

You can implement every security solution in the world, but without enforceable policies, you'll still struggle. "Proper policies and consequences for not adhering to those policies must be considered alongside technology solutions," says

Jessica Ireland, consulting analyst at Info-Tech Research Group. "Training should follow policies as well because users can't be blamed for not knowing when the organization doesn't take the steps to make them aware."

Centralized Security

If you feel like your individual security solutions are getting

out of hand, then you may want to look into consolidating them. Ireland says that tools such as next-generation firewalls help give you a more "centrally managed, streamlined solution" and that "consolidation doesn't mean less effective." She says solutions such as next-generation firewalls can "save a couple of headaches, while actively protecting your network."

Strategies For Integrating Macs In The Enterprise

Assess Compatibility & Address IT Obstacles To Bridge The Windows-To-OS X Gap

EVERY SO OFTEN the enterprise market experiences a subtle, yet impactful change instigated by industry manufacturers. That being said, it's probably not an overstatement to say that Apple is seemingly ushering in a sea change with its recent MacBook Pro price reduction, rollout of OS X Mavericks, and complementary iWork upgrades (with the purchase of a new Mac or iOS device).

All hype aside, if they haven't already done so, many enterprises will need to prepare for integrating Microsoft and Apple hardware and software. We'll explore what this transition means for businesses and what strategies are working thus far.

Adoption Is Slow, But It's Happening

If you're the manager making purchasing decision for your company, you've likely already

had to address the gradual, user-introduced incorporation of iOS devices and the like.

According to Irwin Lazar, vice president and service director at Nemertes Research, major issues with Mac incorporation up to this point have been the inability to manage Macs on the network and software incompatibility. However, "with most desktop management suites supporting Mac, and with most software either being browser-based or having Mac and Windows versions, incompatibilities are no longer a major issue," Lazar says.

When looking at Mac implementation from a fiscal perspective, Mark Tauschek, principal consulting analyst at Info-Tech Research Group, says a small price drop is probably not enough to make Mac hardware compelling on the desktop and laptop side.



Even so, "MacBooks and MacBook Airs are finding their way into the enterprise through BYOD," he says. Users who are given a choice, particularly those in tech companies, often pick Macs, he says. They're also entering companies at the executive level and within niche industries such as graphics-intensive organizations.

"It's taking much longer on the desktop and laptop side, which is to be expected. The iPhone and iPad found their way into the enterprise simply because they were new and there was nothing else really like them," Tauschek says.

Anticipate Your Challenges

As with any significant conversion or integration, there are unforeseen complications. Lazar says IT resistance is often a problem to overcome. "They are already well set up to support Windows machines, so they may not want to add to the mix," he says.

In addition, he cites the aforementioned latent software incompatibilities, perceived high costs (especially up-front costs), and security risk due to the accessibility of built-in Web cameras as potential obstacles that could impede Mac integration.

Another significant problem, Tauschek says, is combining management and visibility in a common management interface. Companies might see this as daunting when they start this initiative and wonder how they can deal with applying policy, authentication, patches, and software updates, he says.

Tauschek says it's really not all that much more daunting than when you carry out this initiative with Windows, but companies might say, "We've been doing it with Windows for so long, it's second nature." He says this is simply fear, uncertainty, and doubt getting in the way.

Key Considerations When Integrating Macs

Mark Tauschek, principal consulting analyst at Info-Tech Research Group, says enterprise adoption of Apple hardware and software boils down to three considerations. For starters, look at your total cost of ownership. Ask, "What does it cost to run these things over three, four, five years—as long as our refresh cycle is?" The second consideration is the familiarity of your users. Most people aren't familiar with OS X and some training will be required, he says. Lastly, he suggests taking into account your ability to support Macs, including areas such as the service desk, imaging, design, and application choices.

Evaluate All Strategies

Incorporating Macs into your workflow doesn't have to happen in one fell swoop. In fact, there are a number of strategies that are already working for companies that are embracing the intermingling of OS X and Windows environments.

For instance, Lazar says you can incorporate Mac support into desktop management systems to implement access control, software maintenance, and logging.

"Create capabilities for Mac users to share information and self-support—blogs and community software are useful for this purpose," Lazar says. "Evaluate TCO for Mac and alternative platforms to discover if higher up-front Apple

hardware costs are offset by lower support costs (often they are)."

Lazar says that Nemertes Research often sees a longer depreciation for Macs in addition to a high satisfaction rate. "Some companies even use Mac availability as a hiring perk," he says.


Support & Manage

If your IT team isn't ready to provide full support for an influx of Apple hardware and software, there's another option available: Apple Care. Lazar says you can use Apple Care for hardware support and send employees to your local Apple store for repairs rather than involve IT.

He also says you should "audit all applications to ensure that they can support

both Mac and Windows and close any gaps."

In terms of visibility, it's critical to find a solution for effectively administering OS X, iOS, and Windows platforms. Why?

Because ultimately the challenge is management, Tauschek says. "If I can get visibility into mobile, OS X, and Windows through one common interface, that's pretty compelling." 

Expect To Monitor A Mixed-Client Environment

Because the majority of enterprises are primarily Windows-based companies, you'll most likely work with a mixed environment (Windows and OS X platforms together) and manage policy through Active Directory, says Mark Tauschek, principal consulting analyst at Info-Tech Research Group. "The biggest integration piece is with Active Directory: applying common policies, authentication, basic security policy, and functionality of all the devices that touch the network," he says.

Broadly speaking, however, this configuration is partly about cost and partly about compatibility, Tauschek says. "Most enterprise applications that run on the client are going to be Windows-based applications and may not have an OS X equivalent, so that's one of the challenges."

BONUS TIPS:

Investigate What You're Diving Into

When determining how Mac hardware will fit into your enterprise environment, think twice before you go down a path of trying to have corporate-issued and fully supported MacBooks, says Mark Tauschek, principal consulting analyst at Info-Tech Research Group. "From a

hardware perspective, you'd have to make a really compelling case for the additional cost. Do your homework on the first and most important part of integration, which is authentication and policy assignment." On the iWork side, remember that the de-facto standard for office suites and documents is Microsoft Office, Tauschek says. "If you want to communicate with the outside world with

presentations or word processing documents or spreadsheets, it's going to be with Office. Compatibility is the key issue with iWork and any other office suite."

Weigh The Benefits

OS X and Apple products in general have a number of productivity-oriented capabilities that workers and companies can benefit from. Irwin

Lazar, vice president and service director at Nemertes Research, says the hardware is easy to integrate with other iDevices and that there's a demand for Macs based on their growing use in the home, too. Lazar says Macs are increasingly more practical in business because of "much fewer issues with software incompatibilities or 'Windows-only' versions of software."

What You Need To Know About 802.11ac

The New Standard Can Support Faster Streaming, Upgraded Devices & More Applications

THE NEXT WI-FI standard has arrived: 802.11ac. Building on the prevailing WLAN specification 802.11n, this newly approved IEEE standard has emerged as the solution for high-capacity data consumption and multi-device wireless connectivity.

Amidst all the talk about how this standard will meet the demands of mobile application bandwidth, numerous considerations for the enterprise come to the forefront. Here we'll take a look at how the 802.11ac standard will impact enterprises and what it means in terms of product purchasing.

Notice The Difference

As an IT professional, you're likely already aware

that the 802.11ac standard is intended to support more users and streamline user transmissions, but what will enterprises be able to achieve at both the end user and data center level?

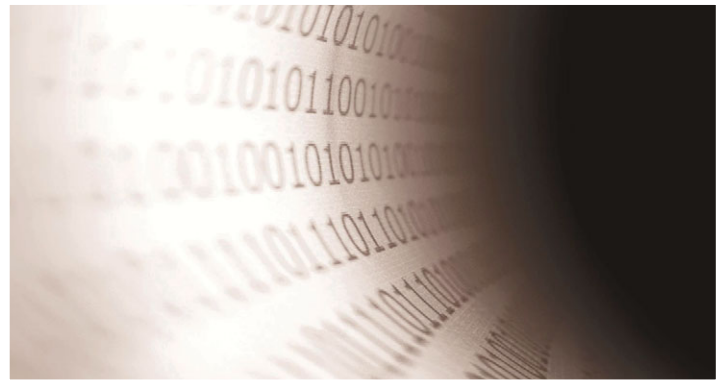
According to Laura DiDio, principal analyst at ITIC, data center managers and end users will see immediate and tangible benefits.

"Data center managers with wireless LAN sites will be able to support more clients at network access points," DiDio says. "802.11ac also delivers more available bandwidth to support greater numbers of parallel video streams. This is crucial because the applications are getting bigger and consuming more bandwidth."

When Will 802.11ac Become Widely Available?

"802.11ac was first introduced two years ago at the 2012 Consumer Electronics Show," says Laura DiDio, principal analyst at ITIC. "However, hardware clients that are 802.11ac-capable are still rare. I would expect this to change within the next six to 12 months because the demand is high."

Philip Solis, research director at ABI Research, says Wi-Fi access points supporting 802.11ac are available now. "But if companies are looking for access points supporting Wave 2 with 160MHz channels and multiuser multiple-input multiple-output (MU-MIMO), they will have to wait a year," Solis says that although 160MHz channels could be used with Wave 2 within the consumer space, they won't likely be used in the enterprise setting "because they are so large that the 5GHz spectrum only supports two 160MHz channels."



Philip Solis, research director at ABI Research, says 802.11ac is cleaner (no Bluetooth or other wireless technologies use it) and has much more available spectrum because it operates in the 5GHz space. "It also uses much wider channels: 80MHz channels compared to 20MHz for 802.11g and 40MHz for 802.11n," he says.

Stephanie Gibbons, connectivity senior analyst at IHS, says that the 5GHz space has multiple advantages. "802.11ac opens up the user to the 5GHz band, which is less congested than the 2.4GHz band (where legacy Wi-Fi products can operate)," she says. "This will help improve overall wireless performance, enabling better productivity within data centers."

A Plethora Of Benefits

In terms of how this standard will impact daily productivity within the enterprise,

ITIC's DiDio says you can expect improved email synchronization, extended battery life, and faster file transfers and file downloads.

Under optimal conditions, 802.11ac offers up to 1.3Gbps of wireless connection speed, DiDio says, but in reality, "a working data center probably won't achieve full 1.3Gbps wireless connection speeds, although 802.11ac will be noticeably faster than 802.11n."

Beyond these advancements in efficiency, integrating the 802.11ac standard shouldn't create much downtime.

"802.11ac is compatible with existing 802.11n and 802.11a deployments, so it's not disruptive to network operations," DiDio says. "This is a huge plus for overburdened data center managers who typically regard new technology deployments with all the enthusiasm of a person facing root canal—minus the Novocain."

ABI Research's Solis says 802.11ac will help enterprise network performance by offering greater capacity and fewer bottlenecks. Enterprise networks will be able to better accommodate employees and guests who want to connect smartphones and tablets to the network, he says. "It means companies can take advantage of newer Wi-Fi access points now if they have a pressing need to increase capacity." DiDio agrees, adding that enterprise networks will be able to handle more clients even on fully loaded networks.

The Right Time For A Purchase

DiDio says the new Wi-Fi standard "has the potential to make a difference in the type of equipment enterprises purchase, but it doesn't mean

they will necessarily or definitely change their purchasing plans." Possibly more than in previous years, however, enterprises have a compelling reason to purchase new mobile devices, DiDio says, including laptops, smartphones, and hotspot access points.

Now that the network will be able to handle more demanding loads, DiDio says that data center managers can instruct their software developers, CTOs, and CIOs to deploy more data-intensive applications (including streaming digital and streaming audio).

Plan Your Conversion

If you're ready to start preparing for an 802.11ac deployment, it's never too early to put together some achievable action steps based on advice

from the experts. These steps should include assessing your current switching infrastructure's capabilities; determining which channel bandwidth

to select; evaluating the performance of your APs during testing; and planning to tune and troubleshoot your new 802.11ac network. **P**

The Advantages Of MU-MIMO Technology

The advent of IEEE 802.11ac has also introduced support for a new technology called multiuser multiple-input multiple-output (MU-MIMO) that enhances spectrum use and allows for multiple user transmissions.

Stephanie Gibbons, connectivity senior analyst at IHS, says that like 802.11n, the 802.11ac standard supports MIMO that employs up to four spatial streams in order to communicate to one client at a time. The difference between MIMO and MU-MIMO, however, is that MU-MIMO "allows each AP to divide the available spatial streams in order to communicate with up to four clients at the same time," she says. This is a key benefit for users in a highly populated area such as enterprises or data centers, Gibbons says.

BONUS TIPS:

Know Your Requirements

Preparing to switch from 802.11n to 802.11ac means there are changes on the horizon, one of which is upgrading your enterprise's infrastructure wiring, according to Laura DiDio, principal analyst at ITIC. "While 802.11ac is a wireless standard, it doesn't mean you can ditch your

wires. In fact, 802.11ac access point second-generation devices require two Gigabit Ethernet ports, which means more cable and switch ports," DiDio says. "That means more time, more money and more planning in advance of a deployment. The onus is on individual businesses to calculate the exact amount required for their specific 802.11ac deployment."

Do More That Just Upgrade

Converting to 802.11ac is not simply about upgrading technology. Prior to implementation, data center managers and C-level executives need to "define and reach consensus on just what they're trying to achieve," DiDio says. DiDio offers the following advice: conduct a thorough audit of your current network infrastructure;

get input from all appropriate members of the IT team to determine challenges and obstacles; test and compare vendor equipment assessing "performance, ease of use, ease of deployment, and management on a pilot network"; and take your time to do it right, even if that means your transition takes two, three, or five years bearing in mind bandwidth and performance constraints.

Check The Health Of Your Data Center

Build A Better Environment Through Assessments, Monitoring & More

IT'S A FACT OF LIFE that every data center will run into the occasional inefficiency or vulnerability through the course of a facility's lifetime. Servers will reach their peak capacities, storage solutions will fill up, and other issues are certain to crop up. The key to responding correctly to these occurrences and maintaining your data center's performance is to always be aware of what's happening.

It takes a combination of data center assessments, monitoring solutions, optimization improvements, and more. But if you commit to keeping tabs on every aspect of your data center upfront, you will be well prepared and avoid largely preventable issues down the road.

Perform Data Center Assessments

Jenna Maertz, consulting analyst at Info-Tech Research Group, says data center managers that don't conduct regular data center assessments simply aren't doing their jobs. There's no way to make sure your data center is in the best possible health without going through every aspect of your facility on a regular basis.

Because technology evolves at such a rapid pace and data centers are adding new equipment every day, it isn't enough to set it and forget it. You need to make sure the building itself is in peak condition and focus on individual pieces of equipment to get



a more solid view of your data center. Moreover, you can't wait until there's already a problem to react and respond.

"Organizations conduct regular security and enterprise risk assessments, but data centers often slip through the cracks," Maertz says. "This is an essential management task that can save you from future aggravation. In a recent survey, Info-Tech found that 53% of respondents do not perform regular data center assessments. These organizations generally only conduct assessments when there is a trigger, such as a disaster or an issue that needs to be resolved."

Improve Your Monitoring

In addition to performing data center assessments, you should constantly monitor your equipment. Having a consistent metrics-gathering process throughout your organization can aid in the assessment process and help you see the bigger picture.

But monitoring can sometimes lead data center administrators down the stressful path of overwhelming themselves with information and feeling as if there's no way to address all the issues.

That's why Maertz says companies need to be more efficient with their monitoring and focus on what's most important, rather than monitoring anything and everything. "For organizations that want to be more diligent about monitoring their data centers but don't have endless time or resources, it is important to be smarter about what you monitor," Maertz says.

"Don't try to map the whole world. Focus on the key metrics that will give you an indication of how well you are performing, without putting a strain on your resources," she says.

Use Existing Resources More Efficiently

If you notice that your data center's performance is lagging,

Know Which Metrics To Track

It's important to have monitoring systems in place to let you know if your data center is running at peak performance, but it's also crucial to gather and track metrics using those same systems. After all, if you only use your monitoring solution as an alert for when something goes wrong, you won't be properly prepared to respond to issues and will be caught unaware more often than not.

"Start with service-delivery metrics like uptime, capacity, growth, and troubleshooting," says Jenna Maertz, consulting analyst at Info-Tech Research Group. "As you get more mature in your processes, you can start assessing resource allocation and cost-to-serve. Focus on metrics that are specific, detailed, and measurable. Don't try to create a metric called 'server performance.' Try to get to a more specific metric, such as 'peak daily CPU utilization percentage.'"

you may think the best course of action is to buy new equipment to replace your existing solutions.

Jay Pultz, vice president and distinguished analyst at Gartner, says that in some extreme cases, when a data center “runs out of fundamental facility resources, drastic steps need to be taken, like building a new and bigger data center.”

Data center overhauls can be pricey, so it’s best if they can be avoided. With “most situations we see, the data center isn’t really out of these resources,” but rather “these resources are just being used inefficiently,” Pultz says.

“Say we have a new data center that was carefully optimized with respect to critical resources,” Pultz says. “Over a few years, significant changes take place where, for example, several racks of new servers are added. If that new equipment is located where it happens to be convenient or all the necessary resources are available, then it won’t take many [of these] changes before usage is far from optimal.”

In other words, your data center’s “bad health” may actually be the result of improperly utilized equipment. One server may be completely overloaded with requests and reaching peak capacity, while another server may be practically untouched. If you can find a way to move tasks and processes to the

underutilized server, then you improve your efficiency and improve the overall performance at the same time.

Consider Incremental Optimization


In addition to utilizing servers and other equipment more efficiently, Pultz says that data centers need to optimize their resources “each time a major change is made,” which is referred to as “incremental optimization.”

Instead of waiting until your infrastructure hits critical mass to respond, be proactive and use new equipment purchases or upgrades as opportunities to improve your data center as a whole.

“Many data center infrastructure management (DCIM) tools on the market today have

the capability to offer data centers and facilities more options and ‘what-if’ scenarios,” Pultz says.

You can use these tools to know, well ahead of time, the potential results of an infrastructure change. By

mapping out your facility and getting a clear view of every piece of equipment, you can make sure servers, storage arrays, and networking solutions are all in their ideal places to optimize your data center performance. 

Use Metrics Wisely

Once you’ve pulled metrics from your monitoring solutions, you need to determine how you’re going to apply them. But it isn’t enough to focus on a single day, week, or even month of data to come up with an entirely new business approach. You need to gather metrics over an extended period of time in order to make informed decisions about your data center.

“Metrics are only valuable when they are repeatable,” says Jenna Maertz, consulting analyst at Info-Tech Research Group. “You will gain only limited insight from a single data point, but a year’s worth of data points suddenly becomes useful in showing the life of that metric.”

BONUS TIPS:

Is Cooling A Culprit?

If your overall data center health is in question and certain pieces of equipment seem to be failing on a consistent basis, then you may want to make sure your cooling systems are working correctly. A solid monitoring system will include temperature as a tracked metric, so

make sure equipment isn’t overheating and leading to bigger issues.

Employee Vigilance

Monitoring systems are helpful to pinpoint specific issues in the data center, but don’t forget to talk to your employees about what they witness. Data center employees work in and around servers and other equipment, so it’s likely they

will spot gradual performance degradation as well as other problems. Plus, these employees may be the same people who will respond to failures when they occur, so it’s better if they’re vigilant and always aware of their environment. Consider holding a “manual reporting” meeting regularly so you can learn about the types of inconsistencies your employees are observing.

Reclaim Server Resources

Improve Efficiency & Utilization Effectiveness Without Hurting Performance

NEARLY EVERY DATA CENTER strives for the highest level of efficiency. And although many companies are making strides toward maximizing their available resources and improving server utilization effectiveness, there is always more to do.

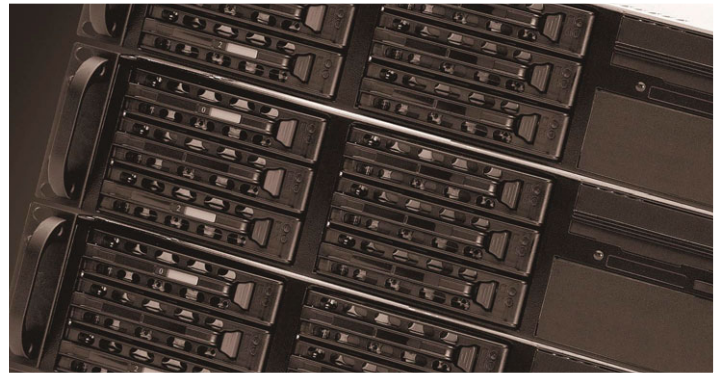
In some cases, you can simply change your approach to server utilization and improve efficiency, but in other cases, you'll need to spend extra money upfront on new servers to cut costs. Regardless of the approach you choose, you'll need to make sure you maintain a balance between performance and efficiency so you can save money and improve the end-user experience.

Strike A Balance

The problem with focusing only on energy efficiency or server utilization is that you may neglect other areas. Greg Schulz, senior advisor with the Server

and StorageIO Group, says you could run a server at high utilization, but you may impact overall performance. You may be maxing out all available resources, but users may complain about how slow everything is, he says. "I've achieved my objective of getting high server efficiency, but what about effectiveness?"

You can also focus too much on efficiency and opt for lower power modes for servers at the wrong times. "Maybe I don't focus on that high utilization and run it at a low utilization rate," Schulz says. "In that quest to become efficient, you could actually introduce new bottlenecks. If we're focused on energy savings, I might put the server into an energy-saving mode, which may put it into a low performance mode. I'm hitting my energy economic budget objective, but I'm missing out on performance."



More Virtualization

The best way to improve server efficiency and utilization effectiveness is to implement virtualization wherever possible. In fact, Nik Simpson, research director at Gartner, says that most companies should be shooting for at least 70% of server loads to be virtualized.

"If you're a long way below that, you're leaving a lot of money on the table not just in terms of energy, but also you have way more servers than you need; you're not getting the management efficiency that virtualization brings," he says. "That's your first step toward server utilization efficiency."

Dave Bartoletti, principal analyst at Forrester Research, agrees that a majority of workloads can be virtualized. "And that means consolidation onto fewer servers for efficiency, but it also means a dramatic improvement in operational efficiency," he says. Not only can you ensure that you are

Key Points

- Virtualize as much as possible to maximize your available resources and drive up overall server utilization.
- Manage your server life cycles to make sure you aren't behind when it comes to efficiency and performance.
- Make sure performance and efficiency are in equilibrium to prevent potential issues.

saving on energy costs by having a lower overall server footprint, but you can also improve efficiency and performance for the sake of your employees.

"Virtual workloads can be duplicated easily, moved while running, backed up easily, balanced across multiple server clusters based on demand, and resized easily," Bartoletti says.

"All the benefits of encapsulation of workloads and consolidation keep increasing

Get Started

Greg Schulz, senior advisor with the Server and StorageIO Group, says that one way to tell whether your servers are running well and efficiently is to listen to users. They may be complaining about applications that are running slow or pages that simply won't load. This could be an indicator of inefficiency. However, Schulz warns that you shouldn't take these complaints at face value. "The first step is to validate complaints," he says. "Is what users are seeing normal or not? Is it consistent? If not, use that information to figure out the problem. Where is the bottleneck, and what's causing it?"

as more and more business-critical apps can be safely virtualized. Beyond server utilization, there's gold in your virtualized environment if you take the time to continually optimize your virtual machines. Don't throw money away on a static virtual environment—explore how you can drive more efficiency, performance, and availability using advanced virtualization features.”

Manage Server Life Cycles

In addition to virtualization, implementing new server technology at the right time is also crucial to maintaining the proper level of server performance and efficiency. Simpson says that he's been in data centers where they're still using servers long after the five-year life cycle that is considered quite conservative. Many companies, he says, are moving to a three-year life cycle on servers, particularly in virtualized environments.

One of the main reasons for the three-year life cycle is that virtualization makes it much easier to upgrade hardware. “In the past, you had to go and rebuild the entire server environment, install the operating system and applications, and make all of the tweaks that you made to it over the years to make it run the way you want it,” Simpson says.

“In a virtualized environment, with something like live migration, you add the new

server into your virtualization cluster, migrate the workloads onto it, turn the old server off, and you're done. That enables more aggressive hardware refresh cycles, and very often you can get payback on the three-year life cycle just in terms of energy improvements.”

On the other hand, for companies that can't necessarily afford to upgrade servers that quickly, Bartoletti says higher efficiency can mean longer life. He says that if you can “continually improve efficiency and back more workloads onto each server, you can prolong or delay new server purchases.”

If you have a limited refresh budget, then make sure you take advantage of new approaches and new software to drive up efficiency and extend your server life cycle. **P**

Action Plan

Spot possible bottlenecks. Make sure you listen to your users to determine whether server performance is as good as it could be. Establish an efficiency baseline and make sure you always have enough resources available for mission-critical applications.

Speak with vendors. Talk with your established technology partners to find out if they have new hardware or software solutions that can help boost efficiency.

Update or upgrade infrastructure. If you can't remove these bottlenecks using your existing equipment, consider upgrading it and implementing more virtualization so you can take advantage of less expensive commodity hardware that also sports energy-efficiency features.

Track your changes. If possible, monitor your server performance. Use established baselines to determine whether your changes have the desired effect.

Top Tips

Awareness. Greg Schulz, senior advisor with the Server and StorageIO Group, says that it's important to have an in-depth view into the environment to know that just because a server is running at high utilization, there may be a performance bottleneck. You need awareness and insight to know how certain changes will either affect efficiency, performance, or both.

Use smart technology when possible. “Leverage modern servers that have intelligent power management and use energy-saving modes,” Schulz says. “Use turbo modes when possible to boost performance, but also let servers go into a slower mode when there's less work to be done.”

Don't push your luck. Dave Bartoletti, principal analyst at Forrester Research, says that how hot you run servers depends on how much risk you're willing to take. He says that for “well-understood workloads with reliable load, you can safely drive up utilization,” but for “spiky workloads or business-critical apps, you might run cooler to reduce the impact of any individual server failure.”

Why You Should Consider Software-As-A-Service

Make Sure SaaS Meets Your Business Requirements, Then Get Started

COMPANIES ARE LOOKING to cloud and software-as-a-service (SaaS) offerings more than ever before. “Adoption rates for SaaS and other cloud software have really increased over the last few years, and spending in SaaS represents a significant percentage of the growth in the overall software market over the next five years,” says Benjamin McGrath, research analyst at IDC.

With the market moving in this direction, it’s important to decide whether your company could benefit from moving some applications offsite to a third-party provider. To aid you in the decision-making process, here are a few tips that will show you how SaaS works, potential pros

and cons, and what to look for in a SaaS provider.

How It Works

SaaS is one of the three most popular categories of cloud service that most people think about, says TJ Keitt, senior analyst at Forrester Research. The other two are platform-as-a-service (PaaS) and infrastructure-as-a-service (IaaS).

“In your own data center,” Keitt says, “the infrastructure would be the servers upon which all things run, the platform is the development environment and all of the development tools necessary to build applications, and the software is the application that people use. SaaS is a method of delivering applications to



organizations without the organization having to host the application on its own premises.”

There are two primary ways that a vendor can deliver a SaaS application. The first is in a multitenant environment where “the vendor has created an infrastructure in which many companies share an instance of the application,” Keitt says.

The second delivery model uses a dedicated infrastructure, which means that “each instance of the application, and in many cases the server, be it physical or virtual, is dedicated to one client.” If you have the option of choosing one model or the other and want to move a particularly sensitive or mission-critical application over to a SaaS provider, a dedicated environment would offer more privacy and security.

Major Benefits

There are quite a few ways SaaS deployments can benefit companies, but perhaps

the most readily apparent is the “elastic resource scaling and elastic use-based pricing,” McGrath says.

“Users can rapidly scale up or down their service usage, allowing for more flexibility. And with that comes use-based pricing, where customers only pay for what they use.” He adds that this scalability allows for “faster access to technology and can create revenue-generating services faster.” And by only paying for what you use, SaaS “might allow for customers to save money.”

But for small and medium-sized businesses, there are a few unique benefits to SaaS that can help level the playing field.

For instance, smaller organizations can have access to technologies that were once only available to large enterprises because of licensing fees. Plus, SaaS applications can typically be deployed more quickly than on-premises alternatives and are simpler to

Determine If Existing Complexity Is Necessary

TJ Keitt, senior analyst at Forrester Research, says some companies turn away from SaaS applications because they think of their in-house software as too complex to fit into the SaaS model. Instead, he suggests looking at your applications to determine whether the level of customization and complexity in the infrastructure is required in the first place.

“The real question is, ‘Are the things that we did before necessary to move our business forward?’” Keitt says. “If the answer is, ‘No, we don’t need 3,000 Lotus Notes applications’ or, ‘No, we didn’t need this level of customization in our CRM system and what the people require is actually a lot thinner,’ it should help smooth the path into a lot of these services. But it requires a long hard look at why your infrastructure is complex and whether that needs to be perpetuated going forward.”

run in many cases, so that also makes it possible for smaller companies to “remain competitive against incumbents in their network” as well as larger organizations in general.

Potential Drawbacks

Although there are many benefits, there are also potential drawbacks to SaaS usage. For instance, McGrath says that some end users have security concerns as well as other issues related to regulatory and compliance issues. And there’s always the potential for downtime at the third-party facility, which could lead to an application being inaccessible for a certain period of time.

Keitt says there are some limitations to SaaS solutions, meaning that you’re likely to see more features and capabilities in an on-premises solution than one hosted in the cloud. These limitations are often caused by insufficient browser environments and multitenancy issues and shared resources, as well as how much customization is allowed in an SaaS solution. “[Vendors] can’t allow, even in a dedicated environment, wild swings or wide degrees of variation in the infrastructure so that it becomes unmanageable,” Keitt says.

Choose The Right Vendor

When choosing a SaaS Vendor, Keitt says you should


look at it as though it were a three-legged stool.

The first leg deals with security and compliance and whether the vendor and its facility can meet your company and industry regulatory standards. The second leg is administration and whether the service’s “admin console provides enough control over the application so that you can configure it in the ways you need for it to fit within your processes,” Keitt says. And the third leg is your internal IT competency and whether you understand the technology well enough to manage it.

“If you take that perspective about what you absolutely require based on your regulatory environment, it will go a long way in helping you make the decision between

a smaller or larger vendor,” Keitt says.

“The things that can be subsumed under your requirements are just the security and policy bits, but also your requirements for certain levels

of customization, integration back into legacy systems you’re going to keep on-premises, and even custom development. How much custom code can we run alongside or within this cloud application?” 

Companies Of All Sizes Can Benefit

When it comes to implementing SaaS applications, companies of all sizes can benefit and should consider implementation as long as it makes sound business sense. “Small and midsized organizations are considering using business applications delivered via SaaS in order to build revenue-generating products and services faster and improve resource utilization, leading to an increase in revenue,” says Benjamin McGrath, research analyst at IDC. “Larger organizations are more driven, on average, by bottom-line benefits, such as reducing the size of the IT budget and potentially reducing headcount, but in recent years the SaaS model has provided more top-line benefits and that’s what’s leading a lot of smaller organizations to consider a SaaS delivery model.”

BONUS TIPS:

Take Inventory

Companies that have already implemented some SaaS should “take an inventory and run a thorough analysis of the costs and benefits of that usage and use that to determine whether to expand the use of SaaS-based solutions,” says Benjamin McGrath, research analyst at IDC. Then, he says, you should

“identify your most pressing IT needs” and decide if a SaaS solution could fill any gaps. Don’t implement SaaS for the sake of SaaS, but instead focus on areas that need improvement and move on from there.

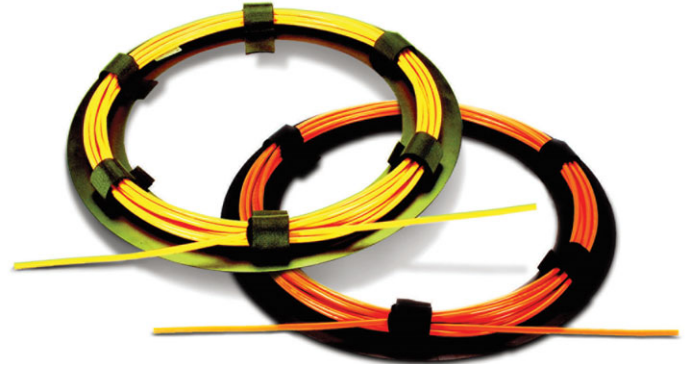
Pick Apps Wisely

To make sure you get the full benefit from SaaS, you should make sure you choose the right applications. For

instance, TJ Keitt, senior analyst at Forrester Research, says that SaaS vendors offer “collaboration applications, human capital management applications, broad-based ERP applications, and CRM technologies,” among others. But you should look at the applications you use and determine whether they should remain onsite or can be moved to the cloud to save internal resources.

BUYING TIPS:

Cable & Airflow Management



MANAGING CABLES is an afterthought. That's an unfortunate reality among many data centers, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Among other things, poor cable management leads to performance problems and issues with troubleshooting and airflow.

Manage The Heat

"Too many times we think that the answer to hot spots and airflow-related issues inside the data center is to lower the temperature point on the AC units," says Matt Burkle, national channel manager at HM Cragg (800/672-7244; www.hmcragg.com). "The problem with this is that it not only wastes energy and money, it doesn't necessarily solve the core issue."

Managing the heat that is generated within the data center is the single greatest way to ensure that the cold air you supply gets to where it needs to go, Burkle says. To help manage the heat created in your data center, make use of products such as rack-level heat containment chimneys, aisle or row air containment systems, and even self-contained cooling enclosures, Burkle says.

"In all of these scenarios, the core concept is the same: The heat that is generated is captured and removed before it can mix with the cold air being supplied to the room." If you eliminate air mixing and remove the heat

before it can negatively affect the cold air supply, then the air at the inlet of the racks will be the correct temperature, he says.

Burkle recommends adopting a strategic environmental monitoring plan with temperature/humidity/airflow monitors at various places in the front of the enclosures. "I'm not too concerned about the heat behind the rack as long as that hot air is being managed, but the temperature at the front of the rack is critical to monitor."

Know Where To Look

The first step toward improving data center airflow is understanding the problem. Koty says the link between cooling efficiency, cooling capacity, and proper airflow can't be discounted. "The two have to work together if you are going to maximize your cooling efficiency. All the capacity in the world won't fix airflow problems like obstacles, air mixing, or lack of static pressure under the raised floor."

Burkle says a simple way to see if your data center has an airflow issue is to spend time walking around during different times of the day. "If you are uncomfortable in the cold aisle, then chances are that your IT equipment is suffering the same fate."

Know How Cabling Impacts Airflow


Cabling can influence airflow and heat. To create a positive

influence with cabling, use a hot-/cold-aisle configuration with cabinets, Koty says. "Only run cables in the hot aisles," he says. "If space is a concern, use tiered racking or trays to separate and elevate the cables within the hot aisle. If cables need to be run in the cold aisle, spread them out on the floor to prevent airflow restrictions."

Koty also advises running cables in straight rows and avoiding crossing cables over cold aisles with 45-degree runs in order to save just a few feet of cable length to cut costs. "You want to keep all cold aisles completely open for better air delivery," Koty says. Also make sure to use grommets to seal openings in

the floor panels where cables pass through, he says, to limit bypass air and to maintain the integrity of the air plenum.

Consider Color & Labeling

When it comes to cable management, Koty says color coding can help identify and trace cables and simplify management. With data cables, use color to identify the cable's role/function or connection type. With power cables, use color to identify and organize dual power feeds for redundant power sources. Secure labels so they're accessible but difficult to remove. Also, maintain a spreadsheet that identifies the cables and colors, where cables come from and go, and configurations. 

CHECKLIST

Know what you need. Where heating and cooling efficiency are concerned, Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says using overhead racking for network and storage cables will prevent air dams from forming under the floor. Be sure your cable management solution keeps cabling out of the way of exhaust fans in cabinets, he says.

Optimize cabinets for cooling. "One of the least expensive methods for improving cooling efficiency is to install blanking panels in cabinets to fill in empty space on the front side of the cabinet," says Whit Wilson, senior engineer at Rack Solutions. "Filler panels are used to control the airflow inside server racks. Without the use of filler panels, the hot exhaust air from the servers can be recirculated through the server and significantly reduce the cooling efficiency of the system."

BUYING TIPS:

Data Center Furniture

IN A HIGH-DUTY AREA such as an enterprise or data center, you need furniture that's both functional and durable. Here's what to keep in mind as you're comparing options.

View The Big Picture

Start at the macro level as you determine your furniture needs. "It's important to look at the big picture when determining what technical workspace solution is going to best serve your company's needs, both economically and functionally," says Kristen Speranza-Diamond, vice president at Hergo (888/222-7270; www.hergo.com).

This is important because you don't want to be in a position a few years down the road where you are forced to start at square one again "because needs have changed and the existing design doesn't offer the modularity required to expand or reconfigure in accordance with current equipment inventory and operational workload," Speranza-Diamond says.

Make Sure It Fits The Space

Know the dimensions of the space and furniture. Also helpful is knowing how a workstation will be used and by how many people to ensure comfort. Be sure to note whether the surface of the furniture has a lip that makes it wider at the top than at the bottom, and don't forget to leave space for

drawers to pull out in cabinets or for people to work in front of the furniture.

Marking the space with tape can show you how much space the furniture takes up as well as what kind of walking space will be left over once it's there. If you prefer not to do it yourself, many furniture vendors offer design templates or free space planning.

Research Available Vendors

A solid data center furniture vendor will have a long track record of providing high-quality products and services. That ensures you can view it as a partner and work with the company for years to come.

"You want a vendor that you can invest in for the future," says Eli Hertz, CEO and president of Hergo. "You don't want to deal with a company that will only be around for a one-time purchase."

Check For Quality

Once your budget is established, you can get the best value for the dollars you spend by looking for the best materials for your price range.

Speranza-Diamond says it's essential to do your homework before purchasing so you don't have to make the same purchases again due to buckling shelving and cracking work surfaces.

For example, the frame makes a big difference in the

durability of a piece of furniture. Especially for desks, a steel frame with cross supports is going to be the most durable model. As for surfaces, high-density laminate and high-density pressboard are good choices.

"Do not just assume that the product is made with heavy-duty steel and high-pressure laminated work surfaces. Ask about weight capacities, manufacturing practices, and warranties," Speranza-Diamond says.

Use Your Space Efficiently

One way to use space more efficiently is to go vertical

rather than horizontal, possibly by investing in pieces of furniture that are wall-mountable. "Office and lab space is at a premium," says Speranza-Diamond. "It's beneficial to go vertical and make the best use of square footage."

Most necessary pieces of furniture and equipment for data centers are becoming less expensive, "so everyone is upgrading and making the transition to go compact," she says. Manufacturers are putting more advanced technology into smaller packages, which will help you put more equipment into each piece of furniture. ■



CHECKLIST

Seek out quality. Although looking for deals can help companies on a tight budget, sacrificing quality as a result can end up costing more in the long term, especially if buying from vendors that don't offer lifetime warranties on furniture.

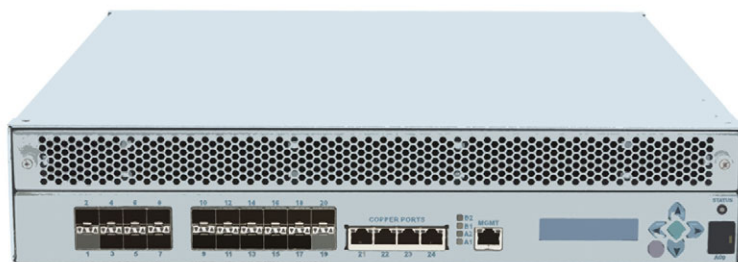
Know the delivery terms. Determine if the delivery includes bringing it inside the facility, requires a lift gate or loading dock, and includes assembly or puts the responsibility on you or a third-party installer.

Go modular when possible. Buying components that are interchangeable lets you modify the setup to meet changing needs, including downsizing or expanding space. Increasingly, individual furniture units can be mixed and matched and layout configurations easily altered.

Build vertically. Purchase components that support building vertically for better space efficiency.

BUYING TIPS:

Networking Components



FOR MOST ENTERPRISES, the network is king. High-end servers, racks full of storage drives, and the most state-of-the-art HVAC equipment aren't good for much of anything without a dependable network.

As a result, almost nothing related to an enterprise network is simple. Whether it's deployment, management, or maintenance, working with a vast network is often complicated. Buying new networking components is no different. Here are some tips.

Know The Lay Of The Land

Take the time to thoroughly inspect your existing network infrastructure before you start filling up the shopping cart. One of the worst mistakes you can make is to buy incorrect and/or unnecessary hardware.

"A key first step to improving your network is understanding your current situation," says Aberdeen Senior Research Analyst Jim Rapoza. "Leading businesses know where their current network is providing value and where it is coming up short."

Consider More Than Just Your Current Vendor

It's easy to become complacent if your vendor's networking hardware has done an adequate job. But in some regards, that's exactly what vendors want. As vendors develop proprietary technologies and

interrelated ecosystems, it's too easy to fall prey to vendor lock-in if you consider your existing network "good enough."

Mike Fratto, principal analyst, enterprise network systems, at Current Analysis, says to make vendors work to earn your business. "Don't just look at your current vendor as your sole source," he says. "Other vendors want to win your business, so they're going to have migration plans [to go] from whatever you're using to whatever they have. Depending on the size of the deal, they're going to offer you better discounts, as well as training and support, because they want you to be successful and happy."

Buy For Expansion

Although Rapoza recommends making purchases that give your enterprise room to grow, he cautions buyers against thinking they need lots of new hardware right now.

"I think the most common mistake is to fall back on the old 'throw more hardware at it' solution to network problems," he says. "When your applications are often cloud-based, and new devices and systems are accessing networks, that approach isn't likely to succeed. Smart businesses do the work to understand their networking situation and figure out what strategies are likely to succeed."

Fratto agrees. "When you overbuy, you're wasting bandwidth and money," he says. According to Fratto, two common examples of overbuying are simply buying too much—such as more switches than your enterprise needs—or buying into a technology that your enterprise doesn't yet need. For example, Fratto says enterprises may not need to invest in 10GbE equipment if 1GbE hardware will do what they need.

Look To The Future

Although you don't want to invest too heavily in technologies your enterprise won't use in the near term, both Fratto and Rapoza say that anyone in charge of purchasing networking equipment does need to keep an eye

on the future. Often, you have to walk a fine line between wasteful spending and future-proofing your network.

"Don't get left behind," Rapoza says. "Top-performing companies understand that new technologies often provide an edge in productivity and business capabilities; they move to take advantage of the competitive boost of these technologies. Track emerging technologies early in their life cycle, even if you don't anticipate implementing a new technology in the near future."

Fratto says the big trend is to start looking at the virtual networking solutions that are out there. "It's time to start evaluating those and getting them out into deployments." **P**

CHECKLIST

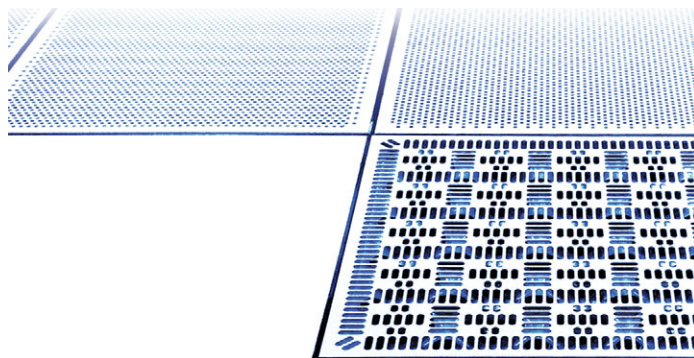
Work with what you have. It's possible to forestall a big purchase or limit your expenses by taking advantage of unused features within your existing infrastructure. For example, using a switch's quality of service, traffic queuing, and traffic engineering might help you improve performance, especially with high-priority traffic.

Do your homework. Find out ahead of time how to incorporate new equipment into your existing network. This is especially important if you mix and match vendors.

Think beyond the network. Network upgrades rarely happen in a bubble. When budgeting, factor in everything necessary (especially the physical plant, for instance) to support the new equipment.

BUYING TIPS:

Flooring & Accessories



EVERYONE KNOWS that servers and power equipment are vital to a data center. But just as important is the flooring that holds them. Choosing the right flooring provides a stable, efficiently cooled data center. Here's what to look for.

Know The Weight

Your data center is a unique facility with its own power, networking, and storage requirements. But it also needs a certain type of flooring, and more specifically certain panels, in order to function its best. Knowing your equipment weight is a good place to start.

Raised floor tiles come in different weight capacities, so consider your weight-bearing requirements when selecting tiles, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com).

The final floor has to be strong enough to support your equipment at the height of the raised floor. Also be aware of rolling load and use heavy-duty floor tiles where you will be moving equipment into and out of the data center.

Remember as rack sizes grow and densities increase, your floor tiles may need to support a greater weight than you have today. Plan ahead and install floor tiles to meet current and future needs, Koty says.

Check The Floor Finish & Material

Be careful when selecting the floor finish, Koty says. "You don't want to be constantly replacing tiles in high-traffic areas to keep the floor looking uniform."

Avoid floor tiles wrapped in galvanized metal, Koty says, as the galvanized-wrapped tiles could cause zinc whiskers over time. If you are using cement-filled tiles, use a sealant to coat any cut edges of your tiles.

Be Aware Of Cooling & Floor Height

If you can maximize the available space under the floor, you can increase your data center's overall cooling efficiency. As for the height of the floor, there are some general standards to follow, Koty says:

- 12 inches for less than 1,000 square feet
- 12 to 18 inches for 1,000 to 5,000 square feet
- 24 to 36 inches for 5,000 or more square feet

Koty says if you want your flooring to accommodate a hot/cold aisle configuration, make sure to plan your under-floor cable layout according to CRAC and PDU/RPP unit locations.

Cable management is also essential. "It's important to plan your under-floor

power cabling layout precisely, establishing designated cable pathways," Koty says. "Making sure you purchase your power cables to the proper length will help to limit congestion and minimize air dams that can lead to cooling inefficiencies."

Check Vendor Experience


If your company doesn't have anyone on staff with experience in data center flooring, don't hesitate to rely on the expertise of a vendor. It can help you choose the right flooring and prevent the need for a potentially costly flooring replacement down the road.

Working with experienced flooring contractors can save you time and money, Koty says. They should be better able to tell you how long the job will take and deliver on

their targeted completion date, he says.

Opt For Accessories

Koty says if you are planning a new raised floor construction job or a build-out, plan ahead and install brushed floor grommets as the floor tiles are being installed. "If you wait to install the grommets at the time the equipment is installed, you have fewer grommet options, plus there is the added risk of introducing contaminants into the data center."

If you're using perforated tiles, Koty says, place them at least six feet away from your CRAC or CRAH units. Otherwise, he says, "the air velocity can be so great that it may cause room air to be sucked through the tiles, which will temper the cold air beneath the raised floor." 

CHECKLIST

Check the fit. Do the flooring panels fit your needs and allow for effective cable management?

Account for cabling. Is there enough open space under the floor for cable routing and cooling?

Know the vendor. Does your vendor have a stellar reputation and testimonials from past clients?

Measure the load. Are all sections of the data center flooring capable of handling the weight and traffic to which they will be subjected?

Network With Your Peers At These IT Training & Association Meetings Across The United States

FEBRUARY

Social Engineering & Manipulation

Feb. 24
Train Ace Greenbelt
7833 Walker Drive
Suite 520 C
Greenbelt, Md.
www.trainace.com

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Wearables DevCon

Feb. 25-27
San Francisco, Calif.
www.wearablesdevcon.com

.....

AITP Twin City

Feb. 28, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

MARCH

Interconnecting Cisco Network Devices 1

March 7
New Horizons Washington, D.C.
1331 F St. N.W., Suite 420
Washington, D.C.
www.dcnnewhorizons.com

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AITP Wheeling

March 12
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

.....

AITP Research Triangle Park

March 13
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

.....

AITP Washington D.C.

March 13
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

AITP

Lehigh Valley - The State Of IT

March 20
Lehigh Carbon Community College
Community Services Center Ballroom
Schnecksville, Pa.
www.lv-aitp.org/events.php

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AITP Long Island - Careers SIG

March 20
5 p.m.
Carlyle at the Palace
1600 Round Swamp Road
Plainview, N.Y.
www.aitp-li.org/?q=node/29

.....

Implementing Cisco Intrusion Prevention System

March 17
New Horizons Tysons Corner
2010 Corporate Ridge
Suite 200
McLean, Va.
www.dcnnewhorizons.com

AITP Twin City

March 28, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

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Interop Las Vegas

March 30-April 4
Las Vegas, Nev.
www.interop.com/lasvegas

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Big Data TechCon

March 31-April 2
Cambridge, Mass.
www.bigdatatechcon.com

APRIL

2014 High Performance Computing Linux for Wall Street

April 7
Roosevelt Hotel
New York, N.Y.
www.flagmgmt.com/linux

AITP Wheeling

April 9
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

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AITP Research Triangle Park

April 10
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

• • • • •

AITP Washington D.C.

April 10
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

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Women In Cybersecurity

April 11-12
Nashville Airport Marriott
600 Marriott Drive
Nashville, Tenn.
www.wicys.net

Configuring, Managing & Troubleshooting Exchange Server 2010

April 14
New Horizons Washington, D.C.
1331 F St. N.W., Suite 420
Washington, D.C.
www.dcnewhorizons.com

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AITP Lehigh Valley - Annual Tour

April 16
www.lv-aitp.org/events.php

• • • • •

AITP Long Island - Healthcare SIG

April 22, 8 a.m.
www.aitp-li.org/?q=node/30

• • • • •

SharePoint TechCon

April 22-25
San Francisco, Calif.
www.sptechcon.com

• • • • •

AITP Twin City

April 24, 7 p.m.
Ozark House Restaurant
704 McGregor St.; Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

**Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.**

PROCESSOR[®]

Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

**To list your company and products,
call (800) 247-4880.**

PHYSICAL INFRASTRUCTURE



For more than 30 years, the industry has trusted Alber with their mission critical batteries. Power interruption in any business means lost revenue. Are you willing to risk not knowing if the batteries will perform when needed? With Alber you'll eliminate these unnecessary risks, while benefiting from reduced maintenance costs, and increased safety. Alber's battery management solutions give you the confidence of knowing you're not leaving business continuity to chance.

Products Sold:

Cellcorder CRT-400, Universal Xplorer Industrial Monitor (UXIM), Universal Xplorer Telecom Monitor (UXTM), BDSU-50 (Datacenter Monitor), DC Load Banks, Battery Capacity Test System (BCT-2000), BDS-40, BDS256-XL, MPM-100

(800) 851-4632 | www.alber.com

PHYSICAL INFRASTRUCTURE



Cablesys, headquartered in La Mirada, California, is a leading manufacturer of high performance fiber cables, fiber jumpers, CAT 6 patch cords, CAT 5e patch cords, CAT 6 cables and connectivity solutions. We have millions in stock that can be shipped same day and best of all, 20% less than name brands.

Products Sold:

- Fiber Optic Cables
- Fiber Patch Cords
- Networking Patch Cords
- Telephone Line Cords
- Audio and Video Cables

Custom Cable Assemblies:

- Pre-bundled Cable Assemblies
- Trunk Cable Assemblies
- Multi-strand Cable Assemblies
- Pre-labeled and Pre-kitting
- OEM Cable Assemblies

(800) 555-7176 | Cablesys.com/pro

PHYSICAL INFRASTRUCTURE



BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 | www.baytech.net

PHYSICAL INFRASTRUCTURE



AVTECH, founded in 1988, manufactures hardware and software for users at all skill levels to easily monitor environmental conditions in IT and other facilities. Their products will monitor, alert, log, graph, view, respond, report, and protect. Over 130,000 customers across 178 countries makes AVTECH a proven market leader, allowing 'Disaster Prevention' instead of 'Disaster Recovery'.

Products Sold:

A full range of environment monitors, sensors and software for temperature, humidity, heat index, power, flood/water, smoke/fire, air flow, room entry, outdoor and fluid temperature, fuel and water tank levels, panic buttons, oil, sound, light, and more.

(888) 220-6700 | www.AVTECH.com

PHYSICAL INFRASTRUCTURE



Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Pa.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 | www.sensaphone.com

PHYSICAL INFRASTRUCTURE



Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

Products Sold:

- Racks
- Enclosures/cabinets
- Motorized workstations
- Flat-panel arms
- Computer desks
- Cable management
- Power management

(888) 222-7270 | www.hergo.com

PHYSICAL INFRASTRUCTURE



Upsite, the "Pioneering Company in Airflow Management Solutions" was founded by Ken Brill, who established the Uptime Institute, a think tank dedicated to identifying efficiencies within data centers. Upsite's LOK Family of energy-efficient solutions are engineered to optimize the data center. This sets Upsite apart. Upsite solutions empower data center managers to leverage cost savings for data center optimization (i.e. releasing stranded capacity, increasing server density, improving system reliability & reducing energy consumption).

Products Sold:

- HotLok
- KoldLok
- AisleLok
- EnergyLok

(505) 798-0200 or (888) 982-7800 | www.upsite.com

PHYSICAL INFRASTRUCTURE



RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

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- Mounting Products

(888) 903-7225 | www.racksolutions.com

PHYSICAL INFRASTRUCTURE



PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 | www.pducables.com

PHYSICAL INFRASTRUCTURE



LINDY USA specializes in cables, adapters, electronics, and accessories for computer, networking, and audio video applications. Since 1932, Lindy has supplied high-quality interconnects to customers in commercial, telecom, and residential markets. What sets us apart is our complete dedication to innovation, performance, and reliability. Our cabling products are truly outstanding.

Products Sold:

- Networking Products
- Sharing, Converting, Extending
- Hardware and Security
- Cables
- Audio / Video
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- Input Devices
- Power
- Much more!

(888) 865-4639 | www.lindy-usa.com

PHYSICAL INFRASTRUCTURE



Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Enclosures
- Strip doors
- Curtains

(877) 746-7540 | www.simplexisolationssystems.com

PHYSICAL INFRASTRUCTURE



Founded in 1995, Austin Hughes Electronics Ltd. is a design and manufacturing group that offers a broad range of solutions based around 19-inch rack-mount technology. With a wealth of experience, Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handles
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- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 | www.Austin-Hughes.com

PHYSICAL INFRASTRUCTURE



Black Box is a leading technology product solutions provider that helps customers build, manage, optimize, and secure their networks. The company is a single source for cabling, cabinets and racks, localized cooling, power and surge protection, environmental monitoring, and more. Black Box also offers a best-price guarantee and FREE, live, 24/7 U.S.-based Tech Support.

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- Cabinets & Racks
- Cables & Patch Panels
- Console Servers
- Cooling
- Datacom
- Industrial
- Infrastructure Hardware
- KVM
- Networking
- Power
- Remote Monitoring

(877) 877-2269 | www.blackbox.com

PHYSICAL INFRASTRUCTURE



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- Cooling and Racks (airflow management, portable cooling)

(800) 672-7244 | www.hmcragg.com

PHYSICAL INFRASTRUCTURE



Snake Tray designs and manufactures a series of innovative and labor-saving cable management, power/data distribution enclosures, and airflow managers. Our products are designed to lower the total cost of construction.

Products Sold:

- Cable Management Systems
- Cable Trays
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- Power and Data Distribution Enclosures
- Airflow Management Systems

(800) 308-6788 | www.snaketray.com

SERVERS



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(713) 430-2182 | www.servermonkey.com

SERVERS



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- A comprehensive line of PC chassis, server/workstation chassis, rackmount chassis, and HDD enclosures.

(909) 947-3200 | www.chenbro.com

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Products Sold:

- Servers
- Network switches
- GPU servers
- Motherboards
- Storage solutions
- Embedded
- Chassis
- Blade servers

(408) 503-8000 | www.supermicro.com

CLIENTS



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- Water coolers

(510) 498-8888 | www.dynatron-corp.com

CLIENTS



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